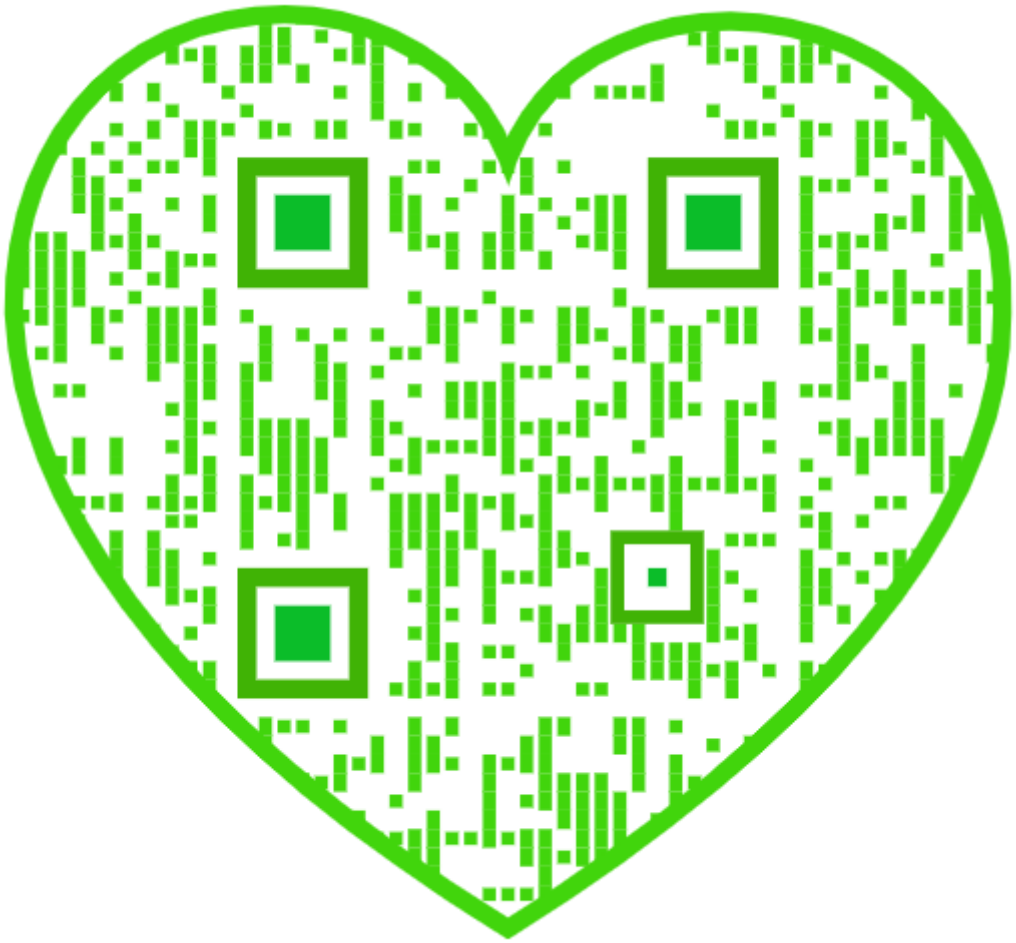
SYNOPSIS OF
PROF. QUITMAN'S LECTURES
ON
MATERIA MEDICA.



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NOTES ON

VETERINARY MATERIA MEDICA.

VETERINARY MEDICINES AND THEIR USES.

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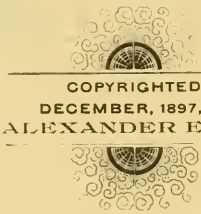

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Notes on Veterinary Materia Medica.

MATERIA MEDICA.—Treats of substances used as medicine, their origin, composition, physical characteristics and chemical properties. Their methods of preparation and administration, their dose, physiological and toxicological action.

Toxicology.—Teaches the effects of drugs when administered in poisonous doses, also their antagonists and chemical antidotes.

Physiological Action.—Is the definite and limited action of a drug upon some part of the organism intended to antagonize or overcome a particular disease (or pathological) condition.

Therapeutics.—Teaches of the use of remedial agents in the various morbid conditions of the animal economy; they are: 1. Medicinal; 2. Mechanical; 3. Surgical; 4. Hygienic or prophylactic as food, clothing, pure air, etc.; 5. Imponderable as heat, cold and electricity.

Pharmacology.—Or the doctrine of drugs, is a science which treats of the drugs employed in medicine, it embraces, therefore, in its scope all of materia medica and therapeutics relating to drugs.

Pharmacy.—Relates to the art of collecting, preparing and dispensing medicine.

The term OFFICIAL PREPARATIONS is applied to such remedies as are authorized by the U. S. Pharmacopœia (in this country), and directed by it to be kept in the shops. OFFICINAL, as commonly used as to be found in all drug stores, but not official.

Pharmacopœia.—Is a book containing directions for the preparation of medicines, with the object of uniformity of nomenclature, preparation and strength of such drugs as may be generally used.

Dispensatory.—Differs from a pharmacopœia in containing the physical and medical history of the various substances,

physiological action and therapeutic application and doses; it contains the whole of the pharmacopœia, with additions by the authors. Its authority rests simply upon the reputation of its authors. In the United States we have the National and the United States dispensatories.

OFFICIAL PREPARATIONS.

There are 994 articles which are official.

RECOGNIZED FORMS IN WHICH DRUGS ARE ADMINISTERED.

The preparations may be solid, semi-solid or liquid.

ABSTRACTA—Abstracts.—(Have been thrown out of the last U. S. P.). They are alcoholic extracts, diluted with sugar of milk to bring them to a standard strength.

They are in solid, dry, powdered form, and represent twice the strength of the original drug, or its fluid extract, (ten times the strength of the tincture).

ACETA—Vinegars.—(2 official). Solutions of the active principles of certain drugs in dilute acetic acid. Strength 10 per cent.

As Acetum opii, vinegar of opium.
Acetum scillæ, vinegar of squill.

ALKALOIDÆ—Alkaloids.—Are active principles existing in plants, extracted by chemical art. They are organic bases, forming salts with acids, and as salts are very soluble in water, and are thus generally used in medicine, as morphine sulphate, etc.

AQUÆ—Waters.—(21 official). Solutions of volatile substances in water; these substances may be either solids, liquids or gases, as water, dist. water, aq. cinnamomi, aq. rosæ, aq. ammon., etc.

CERATA—Cerates.—(6 official). Unctuous preparations similar to ointments, but of a much firmer consistence, they contain wax (cera) and do not melt below 104 F. As ceratum cantharidis, cer. camphoræ, etc.

CHARTÆ—Papers.—(2 official). Strips of paper medicated by impregnation, with medicinal substances, or coated with them.

There are two official papers, chartæ potassii nitratis, intended for smoking, the other for external application as a vesicant or counter-irritant; as charta sinipis.

COLLODIA—Collodion.—(4 official). Liquid preparations having for their base a solution of gun cotton in a mixture of

ether and alcohol, as simple col.; col. flexile, col. stypticum and col. cantharidatum.

CONFECTIONES—Confections.—(2 official). Remedies made into a soft mass with sugar, to render them pleasant to the taste; as a confection of rose et senna.

DECOCTA—Decoctions.—(2 official). These are aqueous preparations of vegetable drugs, made by boiling them for 15 minutes (U. S. P. 1890), and they represent 23 grains of drug to the fluid oz., or 5 per cent strength; as decoctum cetrariæ, decoc. sarsaparillæ compositum.

INFUSI—Infusions.—(4 official). Are aqueous preparations of veg. drugs, using cold or hot water, but without boiling, and let stand for two hours; they differ from decotions only in the degree of heat, 23 grains to ounce; as infusum buchu, infusum catechu, infusum cinchonæ and infusum digitalis.

ELIXIRIA—Elixir.—(2 official). Aromatic, sweetened preparations, containing active medicinal agents in small quantities; as elixir aromaticum and elixir phosphori.

EMPLASTRA—Plasters.—(13 official). Preparations of solid, tenacious, but pliable compounds spread on linen, silk, etc., intended to adhere to the surface of the body; as belladonna plaster, arnica plaster, iron plaster, etc.

EXTRACTA—Extracts.—(32 official). Preparations obtained by evaporating a solution of the medicinal principle of drugs, to a consistence of a soft solid or dryness.

They are termed inspissated juices, aqueous extracts, alcoholic exts., hydro alcoholic, (water and alcohol) and etherial extracts, according to the menstrua used; they are 2 to 4 times stronger than the official agent used.

EXTRACTA FLUIDA—Fluid Extracts.—Are made by first extracting a veg. drug with alcohol, diluted alcohol or alcohol and water; then concentrating the resulting solution by evaporation, and when necessary adding glycerin as a preservative against decomposition. They are of uniform, definite strength, and one minim of the fld. ext. represents one grain of the original drug.

They are a most valuable class of drugs for use in veterinary practice, on account of their concentration and keeping propensities, and the small size of the dose.

GLUCOSIDEA—Glucosides.—They are similar to alkaloids but only differ chemically; this class of drugs can be distin-

guished by their ending in the Latin suffix of inum, or English, in; they are organic compounds belonging to the group of neutral principles which exist in plants and which are resolved into glucos and other principles by the action of reagents, or natural ferments; as santoninum-santonin, salicinum-salicin.

GLYCERITA—Glycerites.—(6 official). Mixtures of medicinal substances with glycerin. There are now 6 official glycerites; as glyceritum acidi tannici (20 per cent), glycer. ac. carbol. (20 per cent), of starch, etc.

LINIMENTA—Liniments.—Thin alcoholic or oleaginous preparations intended for external use, and are made by dissolving drugs in oily or alcoholic liquids; as linimentum saponis, linimentum chloroformi, etc.

LIQUORS—Solutions.—(24 official). Applied to aqueous solutions of non volatile substances which are not otherwise specially designated; as syrups, infusions or decoctions; as liquor potasii arsenitis, liquor plumbi subacetatis, etc.

MASSÆ—Masses.—(3 official). Pill masses, a preparation having proper consistence for making pills; as massa hydrargyri or blue mass; massa copaibæ; and mas. ferri carbonatis.

MELLITA—Honeys.—Differ from syrups in having honey for its base; as honey of roses (mel. rosæ); mel. despumatum, clarified honey.

MISTURÆ—Mixtures.—(4 official). Aqueous preparations of insoluble substances held in suspension by a suitable vehicle; as mistura creta; mistura glycyrrhiza composita or brown mixture, etc.

MUCILAGINES — Mucilages. — (4 official). Thick, viscid liquids, prepared by dissolving gum in water or extracting with water the mucilaginous principles of certain plants.

They are simple bland preparations devoid of medicinal properties, other than that of a demulcent and are used only as such, or as a vehicle; as mucilago acaciæ (34 per cent) muc. tragacanthæ; m. ulmi, (elm).

EMULSIONES—Emulsions.—(4 official). Are mixtures which contain an oil or a resin, in a state of minute subdivision and held in suspension in the liquid, which is some viscid excipient, as gum, soap, alkali, or yolk of eggs.

Natural emulsions are such as exist ready formed in nature, as milk, yolk of egg, etc.

Emulsions of ammoniaci, amygdalæ (milk of almonds) asafœtida and chloroformi.

Oleata—Oleates.—(3 official). Liq. solution of metallic salts and alkaloids in oleic acids, intended for external use.

Official oleates are oleate of veratrine, oleate of mercury and oleate of zinc.

Oleoresinæ—Oleoresins.—(6 official) are made by extracting with strong ether, certain drugs whose medicinal activity resides jointly in oily and resinous constituents, after which the ether is evaporated, leaving this form of liquid preparation the most concentrated which can be produced, as oleoresina zingiberis, ol. piperis, ol. cubebæ, ol. aspidii.

Pilulæ—Pills.—(15 official). Globular masses of medicinal agents, intended to be swallowed whole, as pil. aloes, pil. asafœtida, compound cathartic pill, pilulæ opii, etc.

Pulveres—Powders.—(9 official).—Dry substance in a state of minute subdivision, obtained by pulverization, as pulvis glycyrrhiza compositus, pulv. jalapæ, pulv. ipecacuannhæ et opii (Dover's powders).

Resinæ—Resins.—(5 official). Solid preparations obtained by precipitating the resinous principles of plants, from their alcoholic solutions, by the addition of water; resinæ copaibæ, res. jalapæ, res. podophylii, res. scammonii and resinæ colophyony, volatile oil from turpentine.

Spiritus—Spirits.—(25 official). Alcoholic solutions of volatile or aromatic substances. Such substances may be solids, liquids or gasses; as spts. chloroform, spts. ether, spts. camphor, spts. ætheris nitrosi, spts. ammon. arom., spts. frumenti (whiskey), spts. vini gallici (brandy), etc., etc.

Suppositoria—Suppositories.—Solid bodies consisting of medicinal substances incorporated with cocoa butter (oleum theobromæ) and intended for introduction into the rectum, vagina, or urethra. They dissolve at the temperature of the body and thus set free their contained medicaments. Suppos. of glycerin is official.

Syrupi—syrups.—(32 official). Concentrated solutions of sugar in water, containing flavoring and medicinal substances.

Sometimes containing acetic acid, and occasionally alcohol; they are termed simple, medicated or flavored. Some are used as vehicles, some as flavoring agents and some are medicinal.

Tincturæ—Tinctures.—(72 official). Alcoholic solutions of medicinal substances, all except tr. iodine being from non volatile bodies, in a few cases aromatic spts. of ammonia is used as a solvent, then they are known as ammoniated tinctures.

Spts. ether and spts. nit. æth. are also used as a solvent; they are then known as ætheral tinctures. The spts. of nitrous ether is not used in official tinctures.

Thus we have alcoholic, etherial and ammoniated tinctures.

Tinctures vary in strength from 0.4 (paregoric) to 65 per cent, (tr. soap), the majority ranges in strength, from 5 to 20 per cent, of the active ingredient.

Spirits are all made from volatile drugs. Tinctures, from non volatile drugs.

On account of the large percentage of volatile solvent, tinctures should be kept well stoppered, and away from sunlight, and should not be kept too long, as from evaporation they may become concentrated to a dangerous strength.

Tincturæ-Herbarum-Recentium.—Tr. of fresh herbs. This is a title of a general formula given in the U. S. P. for the preparation of green tinctures, 50 parts of the fresh herbs are to be bruised, crushed or macerated in 100 parts of alcohol for 14 days, then expressed and filtered; this form of trs. is not recommended on account of its variation in strength.

Triturationes—Triturations.—(1 official). Finely comminuted powder composed of one part medicine to 9 parts sugar of milk, as a diluent. (General formula,) only one official; Triturati elaterini.

Trochisci—Troches.—(15 official). Also called pastiles, tablets or lozenges, these may vary in shape, they are small flattened cakes of medicinal substances, incorporated with sugar, mucilage of tragacanth, etc., to give bulk, consistency, and dilution. They are intended for slow solution in the mouth for direct or indirect medication to mucous membrane of mouth, throat, etc.

Unguenta—Ointments.—(23 official).—Soft, fatty preparation of medicinal agents, with a basis of lard, benzoated lard, petroleum or vaseline, or fixed oils, intended for application to skin, for either local or constitutional effect. They are made so as to easily melt at the temperature of the body.

Vina.—Wines.—(10 official). Medicated wines are practic-

ally weak tinctures of a definite alcoholic strength, alcohol being the menstruum used; as vinum opii, V. ipecac, V. colchicum sem., white wines and red wines etc.

This ends the official list of preparations and forms in which medicines are dispensed.

The following are unofficial but more or less common forms.

UNOFFICIAL PREPARATIONS.

Bolus—or Ball, a large pill intended to be swallowed whole, a most convenient form of administering bulky powders.

Balnæ—Baths.—Medicated or plain.

Bougia—Bougies or Pencils.—Urethral and vaginal suppositories, made long and slim for adaptation to these canals.

Cachets—Wafers.—Thin discs made of flour and water, which make a convenient vehicle for administering many powdered drugs in the human.

Capsulæ—Capsules.—Short tubes of gelatine, which slip into one another, for oils, powders, etc.; they dissolve in the stomach.

Collunarium.—Nasal douche or wash.

Collyrium.—Eye wash.

Cataplasmata—Poultices.—Well known device for applying heat and moisture to a part; they are frequently medicated with antiseptics, disinfectants, anodynes, etc.

As to the material and use of poultices, their action will be given under the proper head.

Discus—Disk.—Thin scale of gelatine medicated as required for application to eye.

Dragee.—French name for sugar coated pills.

Electuaria—Electuaries.—Similar to confections, are medicinal powders beaten up with sugar, honey or molasses, to the consistence of thick paste.

Enemata—Enemas—Clysters.—Liquid preparation for injecting into rectum, may be laxative, demulcent, nutritive, stimulant or vermifuge in character; they should be used warm.

Fotus—Fomentation.—Is a lotion used hot, either hot water alone or may be medicated.

Gargarysma—Gargle.—A mixture of solution for application to mucous membrane of throat.

Granulum—Granule.—A very small pill, also called parvule, usually composed of alkaloid or other powerful drugs.

Glycecol.—Jelly troche, whose base is gelatine or isinglass with glycerin.

Haustus; Draught—A Drench.—A single large dose.

Inhalationes—Inhalations.—Also called vapores, vapors, or steaming medicines in form of vapors, gas or an atomized spray, intended for inhalation, for local action on respiratory mucous membrane.

Potus—Drink.—Solution to be used ad. lib.

ADMINISTRATION OF MEDICINES.

Medicines may be introduced into the circulation by various routes; there are seven different ways; as the gastro-intestinal tract, respiratory tract, rectum, the veins and arteries; the subcutaneous cellular tissues and the integument itself.

Gastro-Intestinal Route.—Most frequently employed, because most convenient, the remedies after being swallowed find their way into the circulation, through the walls of the gastro-intestinal blood vessels and the lacteals. Some drugs require to be digested, some are changed into other and more soluble substances and some are absorbed as they are taken.

When Should Medicines be Administered? The curative effects of remedies may be retarded, changed in form or prevented by untimely administration.

Remedies intended to act on the mucous membrane of the stomach should only be given when that organ is empty.

If distant parts are to be affected in the most prompt and efficient manner and the drug is free from distinct irritating qualities, it should be taken on an empty stomach; as when digestion is going on, the contents of the stomach are acid in reaction and if alkalies are administered, combinations take place and salts are formed.

If alkalies are introduced before digestion begins, diffusion of the acid-forming constituents of the blood no doubt takes place, and in this way the acidity of the gastric juice is promoted; likewise acids given before meals increase the diffusion of the alkaline constituents of the blood.

Mineral Acids.—Especially hydrochloric and phosphoric increase the activity of pepsin, when administered during the process of digestion. Alkalies given before digestion begins, have the same effect to some extent, but if taken during digestion, retard or suspend it.

Germicides or Antiseptics.—Interfere with digestion in proportion to their power. Such agents should be given when stomach is empty or nearly so; freely diluted to prevent injury to mucous membrane.

The Sulphates.—Especially the metals, nitrates, chlorates, bromides and salicylates, in the order named, decidely lessen the fermentive power of pepsin, and consequently retard digestion.

None of them should be given during the time of digestion but as long before and after as the circumstances will permit.

Remedial agents intended to enter the blood with the food, must of necessity be given when the conversion of food is going on; iron, the hypophosphites and the phosphates and certain lime salts are of this character, but these remedies should be selected with reference to their action on the digestive fluid.

According to the observations of Eccles, the hypophosphite of potassium, phosphate of iron, lactophosphate of calcium and citrate of iron are among those exerting comparatively little effect on the process of digestion, while others heretofore supposed to be free from injurious action are especially hurtful.

While the stomach contents are decidedly acid, those of the smaller intestines are alkaline, and sufficiently so as to neutralize the stomach acid and to maintain the alkalinity of the intestinal juices.

When, therefore, it is required to have the medicament act on the small intestines, the best time to secure that effect is when the flow of material is in that direction, and other things being equal by combination with alkalies, if the nature of the substance will permit.

Medicines intended to affect the secretions of the liver and pancreas require ample time, and should be so administered as to begin their action when the periods of physiological activity arrive (after meals).

Rectum.—By this route food is given to human beings in disease of the stomach, during which it will not retain food, or during long periods of unconsciousness.

Medicines are introduced in the form of suppositories, clysters or enemas. The salts of the alkaloids are quickly absorbed; morphine, atropine and strychnine salts are absorbed as quickly, and strychnine more rapidly, by the rectum, than by the stomach.

Respiratory Tract.—By this route drugs are administered by inhalation, nasal douche, insufflation and atomization, also intratracheal injections can be considered under this head.

Inhalations.—Used to reach muc. mem. of the throat, lungs, sinuses of the head, and bronchial tubes.

Medicated vapors used for this purpose are either in form of gas or steam. Iodine and carbolic acid are most commonly used either alone or in combination; methods,

1. Pour medicated vinegar or water over hot brick or iron.
2. Medicate water and put hot brick or iron into it.
3. Burn tar, sulphur, etc.
4. Sprinkle chloride of lime about.
5. Turpentine vapors.

Nasal Douche.—For muc. mem. of nostrils, fluid must be tepid, bland and nonirritating; It should be soothing, antiseptic and tonic in character.

Drugs usually used for this purpose are chloride of sodium (salt), bicarbonate of soda, chlorate of potash, permanganate of potash, carbolic acid, iodine; also zinc sulphate, hydrastis canadensis, oil of eucalyptus, listerine, peroxide of hydrogen and tr. chlor. of iron, etc., all in mild solution.

Insufflation.—Powdered drugs blown into the nostrils and fauces.

Atomization or Pulverization.—An atomizer is used with steam or air as the power; sends medicine into the nostrils in an extremely fine spray.

Intratracheal.—Injected directly into the trachea, acts quicker than hypodermatically. Turpentine is injected for bronchial filaria of cattle and sheep. Alkaloidal drugs in solution are frequently administered in this way.

Veins and Arteries.—Ammonia 1 to 2 parts of distilled water is used for parturient apoplexy. Saline injections are used for pernicious anæmia; also alkaloids where very rapid effect is desired.

Use ammonia for snake bites, prussic acid poison, opium narcosis, chloroform asphyxia, etc.

Subcutaneous Cellular Tissues.—Hypodermatic injection is the proper term and is the method most commonly used.

Use distilled water in hypodermic injections; keep instrument clean, and medicine should be neutral or nearly so, so as

not to coagulate the blood. Do not keep the solution too long, as alkaloidal solutions rapidly decompose.

Parenchymatous Injections.—Injections to be deep in the tissues either for a muscle itself or an important nerve trunk; use strychnine for paralyzed muscle, chloroform for sciatic neuralgia, cocaine for local anæsthesia.

Integument or Skin.—Four methods.

1. Enepidermatic or enepidermic.
2. Epidermatic.
3. Endermic methods.
4. Inoculation.

Enepidermatic Method.—Medicine placed and kept in contact with the skin, no friction used to hasten penetration. Solutions of alkaloids in oleic acid and chloroform, pass by osmosis in this manner with ease, but aqueous solutions act very slowly, and alcoholic solutions hardly at all.

Epidermatic Method.—Friction is used to promote the passage of medicaments between cells of epidermis; mercurial ointment, the oleates, salves, etc., are used in this way for local and systemic effects.

Endermatic Method.—Cuticle is removed to make absorption easier, by blistering, then medicament is powdered over denuded surface (derma).

Inoculation; Injected.—Is same as vaccination; introduction of a specific virus into the system.

Methods of Administering Medicines:—

Drenching horses, bit, bottle, rope, syringe.

Drenching cattle.

Drenching dogs.

Administer Anæsthetic Medicines in Feedbag or Proper Inhaler.

Physiological Classification of Medicines.—Actions of medicinal agents are local and general. Drugs act by an elective affinity between drugs and particular cells or tissues.

Effects on different classes of patients are modified by age, sex, breed, climate, habit; idiosyncrasy, disease and surroundings.

Poor surroundings prevent curative effects.

Pigeons can eat morphine or opium.

Rabbits can eat belladonna.

Deer can eat tobacco without any poisonous effects.

General Actions.—Stimulants increase organic activity of any part of the organism.

1. Diffusible or general stimulants cause prompt but transient effects over entire system, as alcohol, ammon., ether, etc.

2. Spinal stimulants exalt the functions of the spinal cord, as strychnine.

3. Cerebral stimulants exalt the functions of the brain, as opium.

4. Cardiac stimulants, as digitalis.

5. Vaso-motor stimulants, as ergot.

6. Renal stimulants, as buchu, copaiba, etc.

7. Stomachic stimulants or tonics, as gentian and ginger.

8. Hepatic stimulants, as nitro-hydrochloric acid.

9. Intestinal stimulants, as physostigma, peppermint, ginger, etc.

10. Cutaneous stimulants, as spts. nitrous ether, etc.

Sedatives.—Lessen functional activity of organs, lower motility and diminish pain, consequently exert a soothing influence on the whole system.

We have general sedatives, as gelsemium, and local sedatives which affect a given part only.

1. Pulmonary sedatives, lobelia.

2. Spinal sedatives, chloral hyd. and bromides, belladonna, etc.

3. Nervous sedatives, bromides of pot. and ammon.

4. Vascular sedatives, as aconite in small doses.

5. Cardiac sedatives, as aconite, veratrum, etc., which will be described under their proper heads.

Tonics.—Are drugs which neither excite action like stimulants, nor depress like sedatives, but produce a permanent though scarcely perceptible excitement of all the vital functions. Their effect being chiefly perceived in the increased tone of vigor of the entire system. (Examples).

Strych. for spinal cord.

Iron for blood.

Digitalis for heart.

Bitters for stomach.

They are drugs which so influence nutrition as to increase the vital power. The following groups are merely subdivisions or local applications of the three foregoing grand divisions.

Drugs acting on protoplasm, blood and low organism or disease germs and parasites are called antiseptics, disinfectants, deodorizers, parasiticides and antiperiodics.

Antizymotics.—Agents which arrest all fermentative processes.

Putrefaction—To Make Rotten.—Is the decomposition of nitrogenous organic matter under the influence of micro-organisms, and accompanied by the development of disagreeable odors, due to the evolution of ammonia and hydrogen sulphide.

Antiseptics.—Arrest putrefaction on or in the body, or arrest septic decomposition by killing the bacilli which produces it or by arresting their developement, examples corros. sub. and carb. acid.

Disinfectants.—Destroy disease germs and the noxious properties of fermentation and putrefaction (outside of the body), by killing or arresting the development of those germs which produce disease, as lime, sulphur gas, etc.

Deodorizers or Deodorants.—Destroy smell, either by absorption, as dry earth, charcoal, etc., or by acting upon them chemically, as chlorine and sulphurous acid, gases, iron sulphate, etc.

Parasiticides.—Kill the various animal and vegetable organism or parasites, as sulphur, iodine, mercurial ointment, etc.

Germicides.—A general term meaning to destroy germs of any kind whether bacilli, spirrili or micrococci.

Antiperiodics.—Check the progress of certain periodically recurring diseases, lessening the severity of their attacks and preventing their return; probably by a toxic action upon the microbes, whose development in the blood by successive crops is supposed to cause the disease. The great antiperiodic is quinine, next in efficiency is arsenic, others are salicin and the alkaloids of cinchona, also iodine and eucalyptus.

Remedies Acting on the Surface of the Body, are termed rubefacients, vesicants, suppurants, caustics, setons, actual cautery, astringents, demulcents, emollients, and diluents.

Irritants.—In general when applied to the skin stimulate or inflame it by attracting an increased flow of blood to the part, and by reflex action produce certain remote effects, then they are called counter-irritants; they relieve or remove congestion, inflammation and pain and by stimulating functional activity promote repair.

Rubefacients.—Produce slight redness of the skin, due to congestion of the capillaries, such are mild ammoniacal solutions, mustard, iodine, mild canth. etc.

Vesicants or Blisters.—Are more active and deep-seated, they inflame the skin and raise vesicles or blisters, (blisters contain a serous fluid composed of about 78 parts water, 18 of albumen, 4 of salts and a little fibrin).

Cantharides and strong ammon. are mostly used.

Suppurants.—Actively inflame the deep-seated cutaneous tissues, especially the orifices of sweat glands and cause pustules and a purulent discharge.

Red iodide of mercury is most commonly used; others, as croton-oil, euphoribum; the vesicants also will act as suppurants when repeated on same spot.

Cauterants or Caustics.—Combine with the water and albumen of the tissues and cause separation of a slough.

Those which produce extensive sloughing and leave an eschar are called escharotics.

Actual Cautery.—Heat, hot iron.

Potential Cautery.—Chemical agents, such as strong mineral acids, glacial acetic acid, carbolic and chromic acids, strong alkalies, chloride of antimony, arsenic, and soluble salts of the heavy metals, as nit. of silver; chlor. of zinc and corros. sub.; when used to arrest hæmorrhage, are called styptics.

Caustics and Escharotics.—Act either by extracting the water of a part, as sulphuric acid, or by corrosive oxidation, as bromine.

Caustics are used to stimulate indolent ulcers, remove warts, growths, and stimulate adhesion of walls of sinuses.

Seatons.—Used instead of blisters or firing; they are frequently used instead of firing on account of being less apt to blemish.

Their irritant action can be kept up for an indefinite length of time.

If severe effects are desired, blistering ointment is smeared on them. They are serviceable in:

Chronic inflammation of joints.

Muscular atrophy.

Deep-seated lameness.

Also used for spavins and atrophy of laryngeal muscles which cause roaring.

In frog for navicular disease, etc.

Rowel.—Is similar to seatons.

Acupuncture.—Needles 3 to 6 inches in length introduced in fleshy parts by rotary movements.

Aquapuncture.—Water introduced by hypodermic syringe.

Actual Cautery.—Hot iron, amends by reflex action, deep-seated faulty nutrition.

Use of Counter-irritants.—In chest diseases, influenza, and other depressing diseases, for reflex action and to arouse heart's action.

Also for chronic or subacute inflammation of joints; and in laryngitis. Don't use irritants during a local acute inflammatory stage; they increase the inflammation and may produce sloughing. Fomentations and poultices are more suitable; but when inflammation has subsided counter-irritants promote absorption of the exudate by local stimulation and tonic action.

Use only iodine on dogs for counter-irritants.

Choice of Irritants.—1. To combat chills, rouse nervous depression or overcome functional disturbances, mustard and other rubefacients are indicated.

2. For more permanent action, in which nutrition is more seriously impaired, as in chronic pleurisy or phlebitis, the vesicants as cantharides are the appropiate remedies.

3. Where bone, cartilage or tendon is chronically affected, red iodide of mercury, hot iron or escharotics are indicated.

Astringents.—Contract living tissues, either by coagulating or precipitating albumen or by contracting muscular fibers, the chief are alum, lime, chalk, salts of heavy metals, acids, and alcohol, tannic acid and substances containing tannin, as oak bark, catechu, etc.

All caustics in diluted form are astringents. These act by coagulating albumen, but ergot, digitalis, turpentine and other volatile oils contract by acting on the walls of the nutrient arterioles. Astringents are used to diminish and modify excessive and faulty secretion, to combat congestion of cutaneous and mucous surfaces and arrest limited superficial inflammation.

Styptics.—Are astringents, used especially to arrest effusion of blood from injured surfaces or vessels.

Some like matico, tow or lint, mechanically check blood flow from superficial vessels, others like most astringents and caustics, coagulate albumen, thereby plugging the leaking vessels, others like ergot, digitalis, ice, and ether-sprays, contract the vessels and allow of natural coagulation, while lead acetate acts both ways.

Demulcents.—Used for inflamed parts which they come in contact with, they sooth, soften and ensheath, and act chiefly mechanically and resemble emollients.

They are mostly bland mucilaginous or oily substances, as gums tragacanth, acacia and mucilage, linseed, starch, treacle, molasses or honey, gelatine, albumen (white of eggs) fats, oils, glycerin and milk.

They lubricate and defend abraded or irritable parts from injury or acrid secretions.

Emollients.—Soften, sooth and relax the parts to which they are applied, they resemble demulcents and include many of the articles specified in that class, as well as those substances which absorb and retain heat and moisture. They are represented by fomentations, poultices and by folds of lint, flannel and hot, wet, woolen cloths, etc.

Fats, oils, lanol, vaseline, parafine, with soap and other liniments are also emollients.

Fatty emollients rubbed into the skin soften and supple it, thus relax the tissues, reduce tension and relieve pain.

Diluents.—Are applied to demulcents and emollients, they are liquid or solid substances, used with more active agents to diminish their activity, water is generally their basis and they include most demulcent drugs.

Diluents in General.—Are agents which dilute the fluids of the body; generally water.

Diluents beneficially dilute and hasten the excretion of pathogenic materials and favor the action of diuretics, diaphoretics, and purgatives.

MEDICINES ACTING ON THE NERVOUS SYSTEM.

That is on the brain, spinal cord, motor and sensory nerves.

Actions of Medicines on the Brain.—Medicines act on the brain, directly on the nerve cells or through the general circulation; some act both ways.

Cerebral Stimulants or Cerebral Excitants.—Stimulate the

functions of the brain, such as alcohol, ether, turpentine, etc.

Alcohol in excessive doses acts as a cerebral depressant, as also the bromides of potash and ammonia.

Hypnotics or Soporifics.—Are agents which produce sleep, without at first causing previous excitement, as bromides, antipyrine and other cold tar preparations.

Narcotics.—Produce sleep, but at first cause cerebral excitement, as alcohol, ether, chloroform and belladonna.

Both hypnotics and narcotics relieve pain.

Anodynes or Analgesics.—Relieve pain by diminishing the excitability of nerves or nerve centers.

They act directly on the cerebral centers or impair the conductivity of the sensory nerve trunks, as chloral hydrate cannabis indica, bromides, opium, etc.

Local Anodynes.—Are those that control pain by acting locally, or in other words, by impairing the conductivity of the sensory nerves and are used locally, as cocaine, opium, belladonna, heat, cold, etc.

Antispasmodics.—Prevent or remove spasmodic contractions of voluntary or involuntary muscles, as the bromides, chloral, belladonna, sulphuric ether, etc.

Anæsthetics.—Are agents which diminish and abolish sensation. (Local and general).

General Anæsthetics.—Produce a state of temporary insensibility.

Local Anæsthetics.—Produce temporary loss of local or circumscribed sensation by paralyzing sensory nerves.

The condition they bring about are termed anæsthesia.

Anæsthetics are allied to anodynes but act more promptly and fully.

The most important, are the general anæsthetics which are inhaled and carried in the blood to the brain and spinal cord, where they paralyze the centers, produce muscular relaxation, and finally cause entire suspension of sensation and power of motion, together with loss of consciousness, and manifestation of life, except respiration and circulation.

They comprise ether, chloroform, nitrous oxide gases, and others.

With animals ether and chloroform are almost entirely used

for general and cocaine for local anæsthesia, ether for dogs, chloroform for horses.

The A. C. E.—Mixture is composed of alcohol 1 part, chloroform 2 parts, and ether 3 parts.

The E. C. mixture, equal parts of chloroform and ether is used in Germany and France.

The Austrian government uses chloroform 1 part and ether 6 parts in cold weather, and chloroform 1 part and ether 8 parts in warm weather.

Chloral hydrate used by the mouth, and morphine hypodermically help the effects of anæsthetics.

Four times as much ether as chloroform is required to produce anæsthesia. Young animals are more susceptible to anæsthetics than old. Dogs are very susceptible, and cannot stand chloroform.

When anæsthesia has been pushed too far, stop the drug, allow plenty of fresh air, remove bindings, induce artificial respiration, slap the body.

Give inhalation of ammonia to stimulate the heart, hypodermic injections of ether, nitro-glycerin, strychnine, brandy or other stimulants. Dilation of the rectum is recommended in human practice.

Agents Acting on the Spinal Cord.—Are termed spinal depressants or depresso-motors, and spinal stimulants or excito-motors.

Depresso-Motors, or Motor-Depressants.—Are agents which depress the motor functions of the spinal cord and sympathetic system; such drugs are used in tetanus, chorea, etc., to lessen excitability of cord; aconite, gelsemium, physostigma, etc.

Spinal depressants act differently. Some paralyze directly, some impede the circulation and thus produce their effect.

Some act by first exciting, then depressing, some by depression without previous excitement, some by diminishing the conductivity of the gray matter of the cord, and thus impede the transmission of painful impressions.

Spinal Stimulants or Excito-Motors.—Increase the functional activity of the spinal cord and sympathetic system, strychnine, brucine, strophanthus, cimicifuga, etc., are used in general debility, paralysis, sluggish action, as of the bowels, etc.

Agents Acting on Nerves.—Sensory nerves are depressed by

all anodynes or anæsthetics, as antifebrin, antipyrine, exalgine, etc., internally, and other anodynes locally, as cocaine, aconite and opium; stimulated by electricity, etc. Motor nerves are paralyzed by curare and similar drugs.

MEDICINES ACTING ON THE EYES

Mydriatics.—Agents which dilate or enlarge the pupil, whether used internally or externally, belladonna, atropia, hyoscyamus, stramonium, etc.

They act by paralyzing the ciliary muscle, and are used to allay irritation, inflammation and pain, also to prevent adhesions between the iris and lens, and to facilitate examination of the eye, especially for cataract.

Myotics.—Contract the pupil by stimulating the ciliary muscle, as calabar bean, and its alkaloid physostigmine, also opium, muscarine, etc. They are used alternately with mydriatics to discover the presence of adhesions of the iris and break them down when of recent occurrence.

DRUGS ACTING ON RESPIRATION

Are termed errhines and expectorants, besides pulmonary tonics and sedatives, which will come under proper heads.

The respiratory nerve center of the group of ganglionic cells controlling respiration, is situated in the medulla, posterior to the vomiting center.

Errhines or Sternutatories.—When applied to the nostrils cause irritation, sneezing and increased secretion; now not used, but formerly used to expel by sneezing, foreign substances lodged in the nostrils, sinuses or respiratory passages, as powdered tobacco, veratrum, album., ipecac, etc.

Expectorants.—Are agents which modify the secretion of the mucous membrane of the air passages, and promote its expulsion.

They are used in catarrhal affections of the air passages; most of them when given in large doses cause vomiting, in those animals that can vomit, and a notable depression of the general circulation.

They are divided into nauseating and stimulating expectorants.

Lobelia, Ipecac, and Jaborandi are Nauseating, Expectorants. In small doses they increase osmosis from the inflamed mucous membrane. In large doses they cause vomiting (when possible)

ANTIPYRETICS ACT BY:

1st. Lessening the production of heat

- (*a*) Lessen tissue change and remove its cause.
  - Cinchona alkaloids.
  - Alcohol.
  - Eucalyptus.
  - Salicylic acid, and the salicylates.
  - Benzoic and carbolic acids.
- (*b*) Acting on the circulation. to reduce its force.
  - General..
    - Aconite.
    - Veratrum viride.
  - Local.....
    - Local blood letting.
    - Poultices.
    - Blisters.

2d Increase loss of heat.

- (*a*) By dilating vessels of skin and increasing radiation.
  - Alcohol.
  - Arnica.
  - Spts. nitrous ether, etc.
- (*b*) By increasing the loss of heat, due to evaporation of sweat (sudorifics).
  - Nitrous ether.
  - Jaborandi.
  - Ipecac et opii.
- (*c*) By abstracting heat from the body.
  - Cold sponging.
  - Wet pack.
  - Ice to surface.
  - Cold drinks.
  - Cold enemas., etc.

3d Mode of action uncertain. Acting probably by lessening force of circulation.

- Purgatives.
- Venesection.

and the mechanical expulsion of mucous. They also increase secretion, generally, and lower blood pressure.

Stimulant Expectorants.—Are eliminated from the system largely by the bronchial mucous membrane which they at the same time stimulate, thus altering its secretion and facilitating expectoration. They diminish secretion, generally, and increase the blood pressure; they include the ammonia salts, benzoin, ammoniac, squills, etc.

Respiratory Stimulants.— Exalt the function of the respiratory centers in the medulla, quickening and deepening the breathing, as strychnine, atropine, digitalis, ammonia, thebaine, etc.

Respiratory Depressants.—Lower the action of the respiratory center, rendering the respirations low and shallow.

They are chiefly opium, in full doses, gelsemium, aconite, veratrum, conium., chloral, ether, etc.

Pulmonary Sedatives.—Relieve cough and dyspnœa by lessening the irritability, either of the respiratory center or of the nerves of respiration.

Some act by direct depression of the respiratory center, as the depressants above named, others by lessening local congestion, as the expectorants, and others by lowering the excitability of the vagus and organs in the lungs, and other nerve filaments throughout the respiratory tract.

Such are opium, hydrocyanic acid, belladonna, cannabis indica, etc.

AGENTS ACTING ON THE CIRCULATION.

Cardiac Stimulants.— Rapidly increase the force and frequency of the pulse in depressed conditions of the heart; alcohol and ether stimulate motor ganglia, physostigmine and camphor, acting chiefly on the heart muscle.

Aq. ammonia, carbonate of ammonia, spts. ammonia aromaticicus, chiefly stimulate the vaso-motor centers.

Other stimulants are atropine, belladonna, morphine in small doses, chloroform, turpentine, aromatic oils, counter-irritation. nitro-glycerin, strophanthus and electricity.

Cardiac Tonics.—Act slower than stimulants, increase the vigor of the heart muscle, slowing and lengthening the contractions, making the heart beat slower, but more regular and stronger. In large doses they cause irregular action of the heart and death

by syncope; digitalis and alkaloids, strophanthus, nux vomica, strychnine, cimicifuga, et.

Cardiac Sedatives.—Lessen the force and frequency of the heart's action, they act directly on cardiac plexus of nerves; aconite, veratrum, antimony, acidum hydrocyanicum potassium salts, and chloroform by inhalation.

Vascular Stimulants.—Dilate the peripheral vessels and increase peripheral circulation, thus equalizing blood pressure and preventing or relieving internal congestions. Arnica is the best; next, ether and alcohol, which also stimulate action of the heart; nitrous ether (nitrites), nitro-glycerin, liquor ammonia acetatis, opium, ipecac, and heat applied locally.

Vascular Tonics.—Cause increased contraction of capillaries and arterioles; they stimulate the vaso-motor nerves, thus raise blood pressure and promote out-flow and absorption of lymph, as ergot, digitalis, iron, hamamelis, cold, etc.

Vascular Sedatives.—Contract blood vessels, lessen the flow of blood through them and thus limit local inflammation and arrest hæmorrhage; ergot, lead acetate, opium, cold, etc.

AGENTS ACTING ON DIGESTIVE TRACT; ON SALIVARY GLANDS.

Sialagogues.—Promote secretion and flow of saliva and buccal mucous. Some act by reflex stimulation, as the acids alkalies, mustard, ginger, and other pungent substances, nauseants also act reflexly from the stomach, these are termed topical sialagogues.

General Sialagogues.—Influence the glands through their nerves, as pilocarpus, pot. iod., mercury, etc.

Antisialagogues.—Diminish salivary secretion. Atropine acts by paralyzing the terminal filaments of the secretory nerves, borax and potassium chlorate lessen it by relieving irritation, opium and morphine, by diminishing irritability of nerve centers.

Refrigerants.—Give a sensation of coolness and thereby allay thirst; as vegetable and mineral acids well diluted, cold water, etc.

On the Stomach.—Ant-acids or alkalies are used to correct acidity of stomach, urine or blood.

Stomachics.—Or gastric tonics, aid gastric digestion and increase the appetite; they act in different ways.

1. Some stimulate the production of juice, as the alkalies before meals.

2. Some stimulate local circulation, as the aromatic bitters, and oils, alcohol, etc.

3. Several act by exciting the activity of the nervo-muscular apparatus of the stomach; as nux-vomica, arsenic, hydrastis, dilute acids, etc.

The various digestive ferments, as pepsin, papoid, ingluvin, pancreatin, etc., are adjuvants to digestion, and are useful to supplement the gastric juice when deficient in quantity and quality.

Emetics.—Agents which cause vomiting; are local, mechanical, or irritant. Emetics are those which act by irritating the end organs of the gastric, œsophageal or pharyngeal nerves, and cause vomiting by reflex irritation of the vomiting center, as alum, mustard, solution of salt, sulphate of zinc, tepid water, bitter infusions, etc.

Systemic or General Emetics.—Act by direct irritation of the vomiting center in the medulla, through the medium of the circulation, the best of which is apo-morphia, also ipecac, emetine, tartar emetic, senega, squills, etc.

Anti-Emetics or Gastric Sedatives.—Are agents which lessen nausea and vomiting, some by a local sedative action upon the end organs of the gastric nerves, called local gastric sedatives, others by reducing the irritability of the vomiting center in the medulla, called general sedatives, the principle of which is hydrocyanic acid, morphine bromides, amyl-nitrite, etc.

Local Gastric Sedatives.—Opium, cocaine, alum, calomel, bismuth sub-nitrate, and carbolic acid well diluted.

AGENTS ACTING ON THE INTESTINES.

Purgatives, carminatives, intestinal astringents, etc.

Purgatives or Cathartics.—Increase intestinal evacuations in one or more of three ways.

1. By accelerating peristaltic motion of the bowels.
2. By increased secretion from intestinal mucous membrane.
3. By limiting absorption of the intestinal fluids.

Purgatives are divided into Laxatives or Aperients, which have the most moderate action, only slightly increasing and softening evacuations, without causing irritation, as small doses of oil, sulphur, green food, sulphates of soda and magnesia in small doses.

Simple Purgatives.—Are more active than laxatives, and are

accompanied by some irritation; they cause more copious and softened evacuations than laxatives; (in small doses they act as laxatives). Large doses of oil, aloes, rhamnus, calomel, rhubarb, etc., act by stimulating peristalsis and secretion.

Drastic Purgatives.—Act far more severely than simple purgatives; they greatly increase peristalsis and secretion, violently stimulate intestinal contractions and cause griping; they promptly produce copious, frequent fluid discharges, and in large doses may cause serious intestinal irritation and inflammation; examples, croton oil, colocynth, elaterium, gamboge and podophyllin; also aloes in large doses.

Saline Purgatives.—Excite increased secretion and prevent re-absorption, thereby mechanically exciting peristaltic action.

They promote osmosis and cause free watery evacuations in full doses, such as magnesium, sodium, and potassium, sulphate, citrate of magnesia, potassium, tartrate and bitartrate, etc.; secretion goes on until the fluid in the intestines becomes a 5 or 6 per cent solution.

Hydragogue Purgatives.—Include the most active of the drastic and saline purgatives. They remove a large amount of water from the system; example, jalop, elaterium, scammony, etc.

Cholagogue Purgatives.—Stimulate the flow of bile, causing green colored or bilious stools, such as mercurial preparations, podophyllin, aloes, etc.

Use of Purgatives.—Are many and varied.

First, to remove undigested food; second, fæces; third, bile; fourth, to remove poisons; fifth, worms; sixth, foreign bodies; also, to reduce plethora and obesity, to allay skin irritation and remove reflex paralysis, and throw off effete material. To relieve and attract blood from other parts, as in congestion of the brain and liver, to lower blood pressure, and relieve congested vessels in general.

Saline purgatives are used to relieve dropsical conditions, as ascites, hydro-thorax and general œdema.

Regarding purgatives in general for different animals; for horses use the following prescription:

Rx	Pulv. aloes	℥ v. to viij.
	Pulv. nuc. vomicæ	ʒ i.
	Pulv Gentian rad.	ʒ ii.
	Pul. Zingiber	ʒ ii.
	M. Sig. Bolus.	

For cattle, use sulphate of magnesia or soda and croton oil. For pigs use epsom salts, 3 to 4 ozs. For dogs use buckthorn, castor-oil, etc.

Carminatives.—Aid in the expulsion of gas from the intestines and stomach, by increasing peristalsis, stimulating circulation etc. The leading carminatives are capsicum, ginger, oils of peppermint and cinnamon, aromatic spirits of ammonia, etc.

Intestinal Astringents.—Contract the vessels, diminish the exudation therefrom, thereby lessening the fluidity of the fæcal discharges. They are used to overcome diarrhœa and act in different ways.

1. Some, like opium, lessen excessive peristalsis.

2. Some, like ant-acids neutralize the acids which provoke excessive peristalsis and secretion.

3. Some, like salol, creosote, naphthalin or other antiseptics and anti-ferments check fermentation and putrefaction and thus arrest the formation of irritants.

4. Others, like tannin, or substances containing tannin, coagulate albumen, and consequently dry up both discharge of mucous and blood.

5. Others, like sulphate of iron and copper, conjoin antiseptic and astringent actions.

6. Mineral acids, metallic salts, etc., act as tonics and are indicated when bowels are in a relaxed and flabby condition.

AGENTS ACTING ON THE LIVER

Are hepatic stimulants and hepatic depressants.

Hepatic Stimulants.—Increase functional activity of the liver cells, and the amount of bile secreted, while the cholagogues remove the bile from the duodenum and prevent its re-absorption by the portal vessels.

The hepatic stimulants are, dilute nitro-muriatic acid, podophyllin, phosphate of soda, calomel, aloes, colchicin, saline-purgatives, etc.

Hepatic Depressants.—Lower functional activity of the liver, by acting upon its functions, viz.:

Bile Production.—Lessened by opium, morphine, alcohol,

acetate of lead, gamboge and magnesium sulphate, and purgatives lessen the production by lowering blood pressure in the liver.

The other functions are diminished by the same drugs. Pancreatic secretion is stimulated by ether.

Medicines which kill or expel worms are termed ANTHELMINTICS, VERMICIDES and VERMIFUGES.

Anthelmintics.—Kill or expel intestinal worms; they include vermicides, which kill the worms, and vermifuges such as purgatives which, without necessarily killing, expel them.

The vermicides are:

1. For bots, a combination of aloes, asafœtida, turpentine and ether (F. D.).

2. For tænia or tape worms, areca nut, filix mas, kamala, kousso, pepo, pomegranate root bark, turpentine, chloroform, and brayera, (called tænifuges).

3. For ascarides-lumbricoides or round worms, the above tænicides with santonin bitters, arsenic and strontium salts, spigelia, calomel, etc.

4. For strongyli or thread worms (oxyuris vermicularis), turpentine and essential oils, tannin and substances containing it, with enemas of common salt, tr. chloride of iron, lime water, alum or quassia.

5. For fluke worms (fasciola hepatica) infesting the liver and gall-ducts of sheep and occasionally of cattle and other animals, causing rot, give good food, plenty of common salt and the soluble iron salts, general tonics and occasional physics, which hasten the removal of flukes which have migrated into the intestines.

Keep the animal on good dry pasture. Always diet an animal before treatment for worms. For worms in dogs, areca nut is the best; male fern is the best for tape worm in man and dogs. Santonin and turpentine for worms in horses, as:

℞

Santonin	grs. xx.
Ol Terebinth	℥ iij.
Aloes Barb.	℥ vj.
Ol Lini.	Oj.

m.

Sig.—Give at one dose.

MEDICINES ACTING ON THE SKIN

Are diaphoretics, sudorifics, and anhydrotics.

Diaphoretics and Sudorifics.—Increase the secretion of sweat, from the skin.

The term sudorifics is applied to the more powerful diaphoretics; they are divided into:

1. Simple Diaphoretics.—Those which enter the circulation and stimulate the sudoriferous glands during their elimination, as jaborandi, liquor ammonia acetatis, spirits nitrous ether, alcohol, salicylates, etc.

2. Nauseating Diaphoretics.—Act by producing relaxation and dilatation of the capillaries, as tartar emetic, ipecac, lobelia, and hot water.

3. Refrigerant Diaphoretics.—Act by reducing the force of the circulation as, potassium and ammonium salts, aconite, veratrum, etc., by acting directly on the nerve centers in the spinal cord, which excite sweating, as pilocarpine and nicotine.

Function of Skin.—Besides being protective, is to excrete effete material from the system and secrete sweat and sebaceous matter.

Sweat, as a whole contains 1.3 per cent solids, one-fourth of which is chloride of sodium, inorganic matter, and three-fourths organic matter, consisting chiefly of fats, fatty acids, and about one-tenth of urea; these are held in solution in the liquid.

The functions of the skin besides protecting, then, is first to eliminate from the system effete material; second, and most important, to regulate the temperature of the body by the secretion of sweat, and in some pathological cases it is used to relieve diseased kidneys.

Use of Diaphoretics.—First to restore checked cutaneous secretion; second, to increase it and hence equalize irregularities of the circulation; third, to counteract congestions of internal organs by attracting blood to the surface; fourth, to lower exalted temperature by evaporation of sweat and elimination of effete material; fifth, to remove injurious waste products which accumulate excessively in febrile, inflammatory and rheumatic disorders; this means being especially valuable when the eleminating functions of the kidneys, bowels or pulmonary membranes are impaired. In such cases, the skin performs a vicarious duty in excreting waste matter, usually eliminated by the other channels. Diaphoretics are very useful in cutting short chills, colds and simple febrile attacks, or aborting diseases that might follow chills. When skin excretion is increased, that of the kidneys is lessened, and vice versa.

Anhydrotics.—Agents which check or lessen the secretion of the skin, first, by acting on the sweat glands themselves, by lessening excitability of the secreting cells or of the secreting nerves; second, on sweat centers by lessening their excitability or removing the excitation; third, on circulation by stimulating the respiration center and relieving venous congestion which excites sweating in weakness and disease; belladonna and atropine act in this way; they also paralyze the ends of the secretory organs, and act most effectively; agaracin is good, salt of zinc also.

MEDICINES ACTING ON THE URINARY ORGANS AND THE KIDNEYS.

Diuretics.—Are agents which increase the function of the kidneys. The functions of the kidneys are, first, to remove excess of water; second, to excrete waste products; third, they retain and re-absorb water. One function may be stimulated without the other; certain diuretics stimulate the excretion of water, while others stimulate the excretion of the solid constituents.

Diuretics.—Are divided into direct and indirect. A direct diuretic stimulates the renal cells, and an indirect diuretic acts by augmenting blood pressure.

1. Refrigerant Diuretics.—Those which act by reducing the force of the circulation; as, water in large quantities, potas. salts, especially acetate, bitartrate, chlorate, citrate and nitrate. These also operate on the cells and increase the amount of solids excreted.

2. Hydragogue Diuretics.—Largely increase the watery constituents of the urine, and in general act by raising arterial pressure, either general throughout the body or locally in the kidneys.

This is accomplished in two ways—directly and indirectly; indirectly, by increasing heart's action; directly, by contracting efferent vessels so as to raise the pressure in the glomerulia and dilate the afferent vessels. This is done by colchicum, digitalis, nitrous ether, strophanthus and alcohol.

3. Stimulant Diuretics.—Are largely eliminated by the kidneys and act upon the entire genito-urinary mucous membrane by local irritation, and in excessive doses may excite inflammation and symptoms of a violent character, as strangury, bloody urine, etc. (all this group should be used with caution) cantharides, turpentine, juniper, uva ursi, buchu, savin, copaiba and hydrangea; these act on the secreting cells of the tubules.

Diuretics are Used.—First, to increase the proportion of water in the urine, thus preventing deposits of solids in the kidneys or bladder and mechanically washing them out when formed or in other words to dilute the urine; second, to expel waste products and poisonous material from the system, as in febrile or rheumatic disorders, or where kidneys are acting tardily; third, to remove excess of fluid from the tissues or serous cavities, as in dropsy of the chest and abdomen, œdema of legs, etc., this excess of fluid (serum) may be due to disease of the heart, kidneys, liver, and as a result of inflammation of a part; fourth to overcome an acid condition of urine, in which give saline diuretics. In herbivorous animals the urine is alkaline, in carnivorous it is acid in reaction.

Renal Depressants.—Lessen secretion of urine; the best one used to overcome diabetes, is a combination of iodine, iron, morphine, etc.

Diuretics and diaphoretics should be used in all fever mixtures.

MEDICINES ACTING ON THE BLADDER.

Lithontriptics, antilithics, urinary sedatives, tonics and astringents. The nerve center controlling the bladder is situated in the lumbar region of the spinal cord, with a presiding center in the brain, which may be set in action either voluntarily or reflexly.

Lithontriptics.—Dissolve when formed; and antilithics prevent the deposit of solids in the urinary organs. Lithia and potassium salts dissolve uric acid, and oxalate of lime calculi, found in acid urine, and phosphatic calculi are best dissolved with benzoic acid and the salicylates in alkaline urine.

Vesical and Urinary Sedatives.—Lessen irritability of the bladder and urinary passages and thus remove pain and straining.

Diluents, such as linseed tea or other mucilaginous drinks are often serviceable; also hot water, hot cloths and cannabis indica. Irritability of nerve centers may be controlled by opium, belladonna and hyoscyamus.

Chronic inflammation is relieved by such astringents as uva ursi, buchu, etc.

Vesical and Urinary Tonics.—Increase the contractility of the involuntary muscular walls of the bladder and ducts.

1. Those like potassium bromide, strengthen the detrusor (ejecting) muscles and prevent retention.

2. Those like strychnine and cantharides, strengthen the sphincter vesicæ and thus prevent involuntary escape of the urine.

Belladonna acts upon the regulating nerve centers and lessens their sensibility.

MEDICINES ACTING ON ORGANS OF GENERATION AND THE MAMMARY GLANDS.

On Generative Organs.—Aphrodisiacs, anaphrodisiacs, ecbolics and emmenagogues, uterine depressants, uterine tonics and alteratives.

Aphrodisiacs.—Stimulate the sexual appetite and function, by direct or reflex action on the genital centers in the brain and cord, as nux vomica, strychnine, cannabis indica, cantharides, phosphorus, alcohol, ergot, and general tonics.

Anaphrodisiacs.—Diminish sexual desire and lower the functional power of the sexual organs either by depressing the special nervous apparatus, or by decreasing the local circulation; examples, tobacco, cocaine, belladonna, gelsem., camphor, monobromate of camphor, bromides, iodides, local cold, cocaine locally, drop 4 per cent solution on glands.

Emmenagogues.—Restore the menstrual functions and are divided into:

1. Direct, which stimulates the uterine muscular fibres and are ecbolic in large doses, as ergot, rue, savine, potassium-permangate, etc.

2. Indirect or tonic, which improves and tones up the blood and nervous system. This is done by iron, manganese, strychnine, cinnamon and other tonics.

Ecbolics or Oxytocics.—Agents which produce abortions by stimulating the pregnant uterus to contract upon its contents; supposed to be by direct irritation upon the center in the cord; this is produced by ergot, ustilago, savine, oil of rue, pilocarpine, violent or irritant purgatives, tansy, pennyroyal, etc.

Uterine Depressants.—Lower the activity of the nervo-muscular apparatus by controlling uterine contraction, the chief of which are, opium, morphine, cannabis indica, bromides and chloroform (but not ether). Viburnum prunifolium is a good tonic in regular aborting animals.

Uterine Tonics and Alteratives.—Improve the vigor and remove morbid conditions of the uterus, viburnum prunifolium, helonias diocia, savine, in small doses, local astringents, cimicifuga, electricity, etc.

On Mammary Glands.—Galactagogues increase lacteal secretion. Jaborandi is the best, castor-oil locally, potassium chlorate, milk, beer, tonics, massage, etc., act beneficially.

Galactophyga arrest secretion of milk. The best is belladonna or atropia applied externally, spirits camphor, potassium iodide, tannin, etc., but do not use balladonna both internally and externally at the same time on a dog, as a dog's skin absorbs too fast.

REMEDIES ACTING ON TISSUE CHANGES.

Include restoratives, tonics, hæmatinics, alteratives, antipyretics, antiphlogistics, deobstruents and resolvents.

Restoratives—Promote constructive metamorphosis and include food, water, stimulants and the different classes of tonics; they also prevent rapid waste.

Hæmatinics or Blood Tonics.—Increase the quantity of hæmatin or coloring matter in the blood, enrich its red corpuscles and thus restore the quality of the blood; the iron and manganese compounds are chiefly used for this purpose.

Alteratives.—Are medicines which alter the process of nutrition and excretion, restoring the normal functions of an organ, or of the system; mercury, iodine and arsenic are the principal alteratives.

Deobstruents.—A medicine that removes functional obstruction from the body, as the purgatives.

Resolvents or Discutients.—Are agents which cause the solution, absorption and elimination of morbid products by stimulating the lymphatic system; these are properly a subdivision of alteratives.

Antipyretics.—Are agents which reduce high temperature of the blood, either by controlling oxidation or increasing the loss of heat.

Bleeding.—If you bleed at all, bleed until the pulse runs down.

Antiphlogistics.—Include all measures and medicines which educe inflammation either local or general.

POISONS AND ANTIDOTES.

Antidotes.—Are agents which counteract the effects of a poison and render it inert.—They are divided into:

1. Chemical, which change the composition of the drug.

2. Mechanical, which surround the drug, preventing its absorption, or protecting the tissues from its action.

3. Physiological, drugs administered with a directly opposite action to that of the poison, to antagonize its action, viz.:

1. For iodine we would give starch, which would form the iodide of starch, this is insoluble and inert. Give acids for alkalies and vice versa; examples of chemical antidote.

2. For corrosive drugs such as corrosive sublimate and other metallic and corrosive drugs, give white of eggs or any demulcent, wash out stomach, etc.; examples of mechanical antidote.

3. Examples of physiological antidotes, for strychnine, give chloral hydrate, for aconite give digitalis and other heart stimulants, for digitalis give aconite, tannin, etc.

Tannin is the great antidote for vegetable poisons, it precipitates their active principles and forms the tannate of the respective alkaloids, rendering it insoluble and thus more or less inocuous, this should be followed by linseed oil to remove it, for the animal that can vomit, give an emetic and follow with the physiological antidote to combat the poison which may have been absorbed.

For Poisonous Gas.—Fresh air, inhalations of steam, artificial respiration, together with stimulants and intravenous injections of ammonia.

ANTAGONISTS AND INCOMPATIBLES.

Antagonists.—Are agents which counteract each other.

Incompatibles.—That relation between medicines which renders their admixture unsuitable, this may be either chemical, physiological or pharmaceutical.

Chemical.—Reaction between drugs, resulting in new compounds.

Physiological.—When a drug opposes the action of another.

Pharmaceutical.—When an unsightly mixture results.

1. Stimulants antagonized by sedatives, alkalies and acids.

2. Never combine free acids with carbonates or hydrates.

3. Strong acids displace weaker ones, and should always be used alone. Two or more soluble salts should in general not be

combined, they may form new compounds with different properties.

4. Alkalies neutralize free acids, they displace weak or volatile bases of salts in solution.

5. Oxides of alkalies decompose the metallic salts, also alkaline salts.

6. Alkaloids in solution are precipitated by alkalies, by alkaline salts, by salts that produce insoluble compounds, by tannic acid, by gallic acid and vegetable substances containing them.

Remember that because a mixture is clear, it does not follow that no incompatibility or reaction has taken place; as substances in solution may be displaced without precipitation, the new product may be soluble in the solution.

7. Corrosive sublimate and potassium iodide should be prescribed alone; acetate of lead, subacetate of lead and nitrate of silver also, except the latter may be combined with opium.

It is best to prescribe the following alone except when the result of the combination is definitely known; sulphuric acid, hydrochloric acid, hydrocyanic acid, tannic acid, lime-water, tr. ferri. chloride, syr., iod. of iron, citrate of iron and quinine, tr. guaiac, salts of morphine, except with the alkaloids, Fowler's solution, and acetate of zinc.

8. Never order a drug in combination with any of its tests or antidotes.

9. Never mix mineral acids with alcohol, they form ethers similar to chloroform.

10. Alcohol or water added to a tincture or fluid extract will throw it out of solution, but not necessarily prevent the physiological action.

11. Never mix glucosides as santonin, colocythin, etc., with free acids, or with a substance containing emulsin, as these agents will decompose it.

12. Corrosive sublimate is incompatible with almost everything, even compound syrup of sarsaparilla is said to decompose it.

13. Iodide of potash decomposes most of the metallic salts; it is best administered alone.

14. Nitrate of silver, acetate and the subacetate of lead are incompatible with almost everything, but may be combined with opium, which though chemically incompatible, is therapeutically active as an astringent and anodyne.

15. Tannic acid and gallic acid and substances containing them, as the astringent bitters, precipitate albumen, alkaloids and most soluble metallic salts.

16. Iodine and the soluble iodides are incompatible with the alkaloids and substances containing them, also with most metallic salts.

17. Poisonous compounds may be formed by mixing iodide of potash or syrup of iodide of iron with chlorate of potash.

Potassium cyanide or dilute hydrocyanic acid, with calomel, bismuth salts, metallic hydrates, carbonates, subnitrates or subchlorides, form the poisonous cyanides. Never combine hydrochloric acid and calomel as corrosive sublimate will be formed.

18. Explosive compounds result from mixing powerful oxidizing agents with others which are readily oxidized.

Chief are as follows:

Oxidizers.—Nitric and chromic acids, hydrochloric acid, nitro-hydrochloric acid, potassium chlorate, potassium permanganate, iodates, nitrates, bichromates, and chlorates.

Oxidizable or Combustible.—Glycerin, sugar, alcohols, oils, charcoal, ethers, sulphur, and sulphites, dry organic substances, phosphorus, iodine and turpentine. Nitrate of silver and creosote when mixed explode, also potassium chlorate and tannic or gallic acids, bromine and alcohol, alcohol and muriate of ammonia.

Resinous Tinctures or Fluid Extracts.—Are pharmaceutically incompatible with aqueous solutions, they are thrown out of solution.

Alcoholic Tinctures.—Are made with diluted alcohol or watery solutions.

Infusions are generally made with metallic salts. Chloral and alkalies form chloroform.

PRESCRIPTION WRITING.

A Simple Prescription.—Is one that contains one drug only.

A Complex Prescription.—Consists of several drugs:

1. The basis or principal active ingredient (curer).
2. The adjuvant or that which assists in action (helper).
3. Corrigens or that which corrects its operation (correcter).
4. Constituents.—Vehicle of excipient, to give it an agreeable form (former).

Thus the object of every prescription is to cure quickly, safely and pleasantly.

Superscription.—Name of party, date and the sign ℞.

Inscription.—Consists of the above subdivisions.

Subscriptions.—Directions to the compounder, directions for administration of medicine, followed by the name of the prescriber. Signature.

Write ingredients in Latin, and usually in the genitive case. When large dose is prescribed, underline or put after quantity. Don't write a prescription from memory; know the individual dose and action of every drug.

Abbreviations, words and phrases used in prescription writing:

℞ means take thou. Fiat, make.
M. Misce, mix.
Et. means and.
Sig. Signa, liable, or write thus.
Numerus, number.
O. Octarius, a pint.
C. or Cong., Congius, gallon.
Ter., thrice.
Dies., diem, day.
Q. S., Quantum sufficiat. Sufficient quantity.
Ad., add, to make.
Bene, well.
q. s. ad. quantity sufficient to make certain amount.
Q. h., quaqua-hora, every hour.
aa. ana. Of each.
ad. lib., ad. libitum. To take at liberty and as much as desired.
B. I. D., Bis in die. Twice daily.
T. I. D., or T. D., 3 times daily, Ter in die.
Q. D., quater in die; 4 times daily.
P. æ., Partes æquales, equal parts.
Bol. Bolus, large pill.
V. O. S., Vitello ovi solutus, dissolved in the yolk of an egg.
Div., divide.
Ft., fiat, make.
Gtt. Guttæ, drops.
Inj.. injectio, an injection.
M. ft., mistura fiat; let a mixture be made.
Pil., Pilula; pill.
Destil, Destilla; distill.
Elect, Electuarum; an electuary.
F. pil., Fiat pilulæ, make pills.
In. d., In. die.; daily.
Liq., liquor. a solution.
Pulv., Pulvis; powder.
Fl., fluidus, fluid.
M., Minim, S. Semis, means half.
S.S. Semi or Semissis means one-half.
Cum, with.
Stat., statim, immediately.
Cola, strain.
Filtra, filter.

ʒ Drachm, dram. ℈ Scruple. ℥ Uncia, ounce.

Remember, don't give too large a dose.

1. Prescribe as few remedies as possible.

2. Prescribe no drug without knowing fully its action and how it acts.

3. Be careful that your prescription is correct and written plainly.

4. Be careful of abbreviations.

5. A maximum dose is the largest dose that it is safe to give. A minimum dose is the smallest dose which will produce the physiological action. If you are not sure of the dose, put

down a small quantity instead of a large one; and always think of antagonists and incompatibles.

Abbreviations that may be mistaken:

Ammon. may mean ammonia or ammoniacum.

Ac. hydroc. may mean ac. hydrochloricum, or hydrocyanicum.

Chlor. may mean chloral, chlorum, or chloroformum.

Hyd-chlor. may mean hydrate of chloral, or hydrargyri chloridum.

Sulp. may mean sulphur, sulphas, sulphidum, or sulphitum.

Zinc-phos. may mean zinci phosphas, or zinc phosphidum.

These words should always be spelled out in full to avoid mistakes.

In prescribing always take into consideration the size, age, species, race, habit, temperament, idiosyncrasy, disease and climate in apportioning the dose of agents.

The dose of most fld. exts. for a horse is about 1 dr. That excepts the powerful poisons, such as aconite.

The dose of most powdered drugs is about 1 drachm, except the alkaloids.

The dose of trs., except the poisons, about 1 oz.

The hypodermic dose is about one-half the amount that is given by the mouth.

The dose per rectum is about twice as much as by the mouth.

Doses.—One-half as much again for cattle as for horses; one-half as much again for sheep and goats as pigs; one half as much for cats as dogs. Horses, 1; cattle, 1½; sheep and goats, ½; pigs, ⅛; dogs, $\frac{1}{16}$; cats, $\frac{1}{32}$.

Dogs take about the same dose as the human, but, consider the size of the dog.

Pigs twice as much as the human.

Sheep and goats three times as much.

Horses 16 times as much.

A teaspoonful represents about ℥ i. A dessert spoon, ℥ ii. A table spoon, about ℥ ss. A wine glass full, ℥ ii. Coffee cup, ℥ v.

Tables for regulating the dose for young animals:

HORSES.

3 years old and upward, 1 part.
From 1 ½ yrs. old to 3 yrs., ½ part.
From 9 to 18 months old, ¼ part.
From 4 ½ to 9 months old, ⅛ part.
From 1 to 4½ months old, 1/16 part.

CATTLE.

2 years old and upward, 1 part.
From 1 to 2 years old, ½ part.
From ½ to 1 year, ¼ part.
From 3 to 6 months, ⅛ part.
From 1 to 3 months, 1/16 part.

From ¼ to 1 year old, 1 part
From 3 to 6 months, ½ part.
From 1¼ to 3 months, ¼ part.

SHEEP.

2 years old and upward, 1 part.
From 1 to 2 years old, ½ part.
From ½ to 1 year, ¼ part.
From 3 to 6 months, ⅛ part.
From 1 to 3 months, 1/16 part.

PIGS.

1½ years and upward, 1 part.
From 9 to 18 months old, ½ part.
From 4½ to 9 months, ¼ part.
From 2½ to 4½ months, ⅛ part.
From 1 to 2 months, 1/18 part.

DOGS.

From 20 to 45 days, ⅛ part.
From 10 to 20 days, 1/16 part.

ACTIONS AND USES OF REMEDIAL AGENTS—RESTORATIVES.

Regarding Food for Sick Animals.—When a sick horse refuses food, he will often drink milk and eggs. Use about one gallon of milk and one dozen of eggs beaten together, but withhold water from him so he will drink it, as the milk will act as water and food both. If he will not drink it, drench it down him. Oat meal gruel and whisky, scalded oats salted; green food when in season may be given.

For sick dogs give bismuth to settle the stomach; eggs and beef tea peptonized for nourishment.

Food for Very Young Puppies.—Give equal parts of cow's milk and aqua calcis, sweetened a little. Never give clear milk alone to very young puppies, as their digestive organs get disordered, possibly causing their death; let them nurse from a bottle. As they get older lessen the quantity of lime-water.

Always water a horse from 15 to 20 minutes before feeding; likewise feed hay before grain, for if fed grain first the water may sweep the grain from the stomach before it is digested and cause acute indigestion.

Grain is digested in the stomach and hay in the intestines.

Aqua Destillata—Distilled Water.—Water freed from its organic and inorganic impurities. This alone is official.

Aq. Fluvialis, river water.
Aq. Fontana, well or spring water.
Aq. Bueliens, boiling water.
Aq. Communis, common water.
Aq. Fervens, hot water.
Aq. Marina, sea water.
Aq. Pluvialis, rain water.

Diseases are frequently conveyed by water. Typhoid fever, epizootic disease, larval stages of worms, diphtheria, etc.

Water will be considered only when used as a remedial agent.

Internally.—1. Water is a necessary constituent of all tissues.

2. A certain amount is necessary to the digestive process.

3. Excessive quantity impairs digestion by weakening the gastric juices, therefore water one-half hour before feeding.

4. Water too cold impairs digestion and brings on congestion.

5. Water is a natural diuretic, flushing the kidneys as it were, and should be allowed freely to a feverish patient.

6. It also dilutes the fæces and other fluids of the body, increases perspiration, and acts as a stimulant.

Physiological Effects of Water — External. — In applying water externally the temperature must be considered.

Effects of Cold Water.—Cold water abstracts heat from the surface of the body and affects the condition of the internal organs through the nervous system.

Cold water first contracts then dilates the blood vessels.

Effects of Warm Water, Externally.— Dilates blood vessels and diminishes the tension, soothes irritable nerves by a direct action, also by removing the blood pressure.

Summary.—Water internally, is:

1. Stimulant; 2, restorative; 3, diuretic; 4, diaphoretic; 5, diluent; 6, antipyretic; 7, laxative; 8, In vomiting animals, water is an emetic.

External.—Cold is:

1. Astringent; 2, Stimulant; 3, antiphlogistic.

Externally.— Hot water is anodyne, very hot is a styptic, removes congestion and pain by increased flow of blood, which it does by dilating capillaries and other blood vessels.

Methods of Applying Water.- For horses use sponging, fomentations, wet pack, soaking tub, sweat bandage, etc., and hip or sitz bath for dogs.

Therapy.—1, For sprains use hot water; 2, bruises, hot; 3, cleansing wounds, hot; 4, azoturia, hot; 5, congestion of kidneys, hot; 6, brain trouble, hot and cold alternately; 7, metritis, hot; 8, hæmorrhage or strangulated hernia, ice water; 9, for rectal ene-

mas or injections, always use warm water; 10, laminitis, use hot and cold water alternately to stimulate the circulation, as the cold water contracts and the hot water dilates, consequently will relieve the foot of the congested blood, and follow with hot poultices of flax seed meal; 11, nail wounds in the foot should always be soaked in hot antiseptic water, as hot as the animal can bear, and then follow with an antiseptic poultice; 12, hot wet blankets for bowel and chest troubles; 13, for uterine hæmorrhage, ice water in the uterus and over the loins; for thermic fever, cold water over head and neck and occasionally over entire body.

DIGESTIVE FERMENTS.

PEPSINA—Pepsin.—A digestive ferment obtained from the pig's stomach.

Properties—A fine white or yellowish white amorphous (formless) powder, pale yellowish or yellowish transparent scales or grains free from offensive odor, having a mildly acidulous or slightly saline taste, followed by a slight bitter taste.

Soluble in about 100 parts water, but more soluble in water acidulated with hydrochloric acid, which adds to its digestive power. If heated in solution to 212 degrees F. it loses its digestive power.

Preparations.—There are a number of pharmaceutical preparations, but the pure pepsin is the only one of value, and the liquor pepsini is useful in dog practice.

Antagonists and Incompatibles.—Alkalies and the mineral salts precipitate pepsin from solution; tannic and gallic acids, creosote, etc., are incompatibles. Alcohol and all alcoholic liquors destroy the activity of pepsin.

Synergists, lactic, hydrochloric, acetic, citric and malic acids promote the digestive activity of pepsin.

Physiological Effects.—Pepsin dissolves proteids and converts them into peptones, but does not affect fats or starch. One grain of pepsin will dissolve about 2000 grains of albumen.

Its value then is limited to young herbivorous animals while living on milk, as dogs. It should be given along with or after meals. Hydrochloric acid does more good than pepsin in our adult patients.

Therapy.—For young herbivorous animals or dogs suffering from indigestion in any of its forms, (pot-bellied, diarrhœa, long, shaggy coat, or constipation, etc.), pepsin is indicated.

Dose.—For foals and calves, 10 grains to one dram. For dogs, 1 to 10 grains of the golden scale pepsin. Liquor pepsin for dogs, 1 to 2 drachms.

For indigestion in suckling calves or colts:

℞ Pepsini puri. ℥ ss
Acidi hydrochlorici diluti. ℥ jss
Aq. qs. ad. ℥ xij
m.
Sig.—One oz. in ½ pint water after meals.

Allied Drugs—Pancreatin.—From the pancreas of animals; digests albuminoids, converts starch and glucose into sugar, hence is better for our animals; acts only in presence of alkalies, it converts albumen into peptones, emulsifies and saponifies fats. Best administered about three hours after feeding, as the acid of the stomach destroys its action. Dogs take from 4 to 10 grs.

Ingluvin.—Is prepared from the gizzard of the domestic fowl, and owes its digestive action to its bitter principle; it is used in vomiting of pregnancy. For women 10 to 30 grains, and in proportionate doses for dogs.

Papain-Papayotin.—This is obtained from the papaw or carica papaya tree of the tropics. As it is taken from the tree it is too powerful a digestive to be given internally, but a preparation of it is called Papoid or Papain. It is soluble in water, and is given in 1 to 5 gr. doses for the human. Foals and calves would take 5 to 30 grs., and dogs 1 to 5 grains. It can also be given to horses. It acts equally well whether in presence of an acid or alkali, and its action is continued into the intestines. It digests all kinds of food, and is undoubtedly the best of the artificial digestive ferments for our animals.

A 5 to 10 per cent solution, or ½ to 1 dr. to the 1 oz. of water is used to dissolve diphtheritic false membranes. It is also introduced into tumors and cancers for the purpose of digesting them. Sometimes it is used in fistulous withers in the above strength. It is known as vegetable pepsin. It converts albuminoids into peptones, starch into maltose; and emulsifies fats.

Acidum Lacticum, Lactic Acid—Properties.—A syrup liquid containing 75 per cent of absolute lactic acid, pale wine color, and mixes in all proportions in water, alcohol and ether.

Antagonists and Incompatibles.—Alkalies and mineral salts.

Synergist.—Pepsin, vegetable acids, hydrochloric acid, etc.

The dose for colts is 15 to 60 Ms.; calves, $\overline{3}^{ss}$ to $\overline{3}j^{ss}$; for dogs, 5 to 20 Ms.

Physiological Action.—Aids digestion, promotes appetite. Large doses cause pain and flatulence; when lactic acid is in excess in the blood it is supposed to cause rheumatism; if administered during diabetes will cause rheumatism.

Therapy.—Used in all forms of dyspepsia, is a solvent of false membranes, is frequently prescribed with pepsin and used in most forms of indigestion. Also used in diabetes.

MINERAL ACIDS.

Acidum Sulphuricum, Sulphuric Acid.—Oil of vitriol, contains 92.5 per cent of absolute sulphuric acid. Colorless, oily liquid, odorless, has a great affinity for water and albumen. Mixing with water it evolves great heat. It is one of the strongest mineral acids, decomposes and chars all organic substances, stains the tissues black, (carbonizes); therefore you can always tell when a horse has been poisoned with sulphuric acid.

Acidum Sulphuricum Dilutum, Dilute Sulphuric Acid.—Contains 10 per cent of official acid. (Always order the chemically pure acids.)

Doses.—Horses, 2 drs. to 1 oz., according to purpose. Average dose, $\overline{3}^{ss}$. Cattle—1 to 4 ozs. Pigs—½ to 2 drs. Sheep—1 dr. to ½ oz. Dogs—3 to 30 M.

Acidum Sulphuricum Aromaticum.—Aromatic sulphuric acid or elixir of vitriol, composed of sulphuric acid 100 parts, tincture of ginger 50 parts, oil of cinnamon 1 part, alcohol to make 1000 parts.

Doses.—Horses, ½ to 2 ozs.; foals, 2 to 6 drs.; pigs, 1 dr. to ½ oz.; calves, 2 drs. to 1 oz.; cattle, 1 to 4 ozs.; sheep, 2 drs. to ½ oz.; dogs, 5 m. to ½ dr.

Alway give these acids diluted with 40 to 50 times their bulk of water. This is the best form in which to use sulphuric acid.

Physiological Action.—It is a powerful caustic and escharotic, carbonizes, turns tissues black. It is also when diluted an astringent and antiseptic tonic, and in small doses an antidote for alkaline poisons. It is eliminated by the kidneys, and lessens the alkalinity of the urine. In the blood it is turned into sulphates and as such is eliminated; when diluted is astringent, both locally and internally, and checks secretions.

Antagonists and Incompatibiles.—Alkalies and their car-

bonates, salts of lime and lead; antagonize all mineral acids, for their action is the same.

Toxicology.—All mineral acids when swallowed in concentrated form, immediately produce retching with vomiting, in those that can vomit, the material vomited is acid, often dark, viscid and bloody and contains shreds of mucous membrane, the lips, mouth, and fauces are red, inflamed and swollen, stained black if from sulphuric acid, yellow or tan if from nitric, and whitish or pale yellow if from hydrochloric acid. From irritation and swelling of the throat, breathing is difficult and death may ensue from suffocation, great abdominal pain, rapidly increasing prostration, and death in from 1 to 24 hours. Post-mortem examination will show the characteristic stains of the different acids, erosions of mucous membrane which will also be soft, swollen and inflamed, and possibly perforations of the stomach.

Death may be due to overcoming the alkalinity of the blood.

Antidotes.—Alkaline bicarbonates, chalk or carbonate of magnesia, given in milk, in small quantities, at short intervals. Demulcents are subsequently administered, such as oil, slippery-elm tea, cream, etc. Trachæotomy may have to be performed where there is danger of death due to swelling of air passages.

For sulphuric acid poisoning, *no water* should be given, but white of eggs or oil with above alkalies in them.

Medicinal Uses.—Sulphuric acid is prescribed internally as a tonic and astringent, in chronic diarrhœa and dysentery, it is usually given with tincture of opium, in flour or starch gruel, and is given in purpura hæmorrhagica with other tonics, such as cinchona, nux vomica, etc.

In ulcerated sore throat give about ℥ss to ℥i of the dilute acid to a pint of water; it arrests excessive perspiration, corrects gastric derangement and diarrhœa in milk feed animals and whey feed pigs. Also use for hæmorrhoids, and antidote for poisoning by lead, carbolic acid, and alkalies.

For diarrhœa and dysentery:

℞ Ac. Sulphuric Arom.
Tr. Opii.
Spts. Camph. aa. ℥ vj.
m. Sig.—1½ ounce every 2 hours in ½ pint flour gruel.

Local Uses.—To touch up ulcers, gangrene, remove warts, hæmorrhoids, fungus growths, mild wash in itching skin disease, ½ ounce, to water 1 pint. Sulphuric acid penetrates deeper into

the tissues than nitric acid; when used externally always grease the surrounding space to prevent scalding the healthy parts and removing the hair where it runs down.

Acidum Hydrochloricum, Hydrochloric Acid—Muriatic Acid is the common name.—Properties; a liquid composed of 31. 9 per cent absolute hydrochloric acid, 68. 1 per cent water. It is a fuming colorless liquid of a pungent suffocating odor, an intensely acid taste and reaction.

Official Preparations.—Acidum hydrochloricum dilutum 10 per cent strength; acidum nitro-hydrochloricum or aqua regia, full strength is composed of nitric acid 180 parts, and hydrochloric acid 820 parts.

Acid nitro-hydrochloricum dilutum or dilute nitro-muriatic acid has 40 parts of nitric acid, 180 parts hydrochloric acid and 780 parts of distilled water.

Nitro-muriatic acid dilute, is a colorless or faintly yellow liquid, odorless or having a faint odor of chlorine, very acid and reaction. Dose of the full strength is ½ to 2 drs. but is not taste usually given in full strength.

Dose of acidum hydrochloricum dilutum.—Horse, 2 drs, to 1 oz. average ½ oz; cattle, 3 drs. to 1½ ozs; pigs, 10 to 30 Ms; dogs, 3 to 20 Ms.

Dose of dilute nitro-hydrochloric acid.—Horse, 2 to 4 drs; cattle, 3 to 6 drs; pigs, 10 to 20 Ms; dogs, 3 to 10 Ms.

These acids should be diluted with 40 to 50 times their bulk with water.

Physiological Actions. - Corrosive and irritant in concentrated doses, in medicinal doses are astringent, antiseptic, tonic, and antidote for poisoning by alkalies. They stimulate the appetite and digestion. They are excreted with the urine, diminish its alkalinity. Topically, these acids are caustic.

The effect of hydrochloric acid on the secretions differs from that of sulphuric and nitric acid. Sulphuric acid checks the secretions, while nitric acid increases it, but hydrochloric acid does neither. Their tonic effects and antidotes are the same.

Therapy.—Hydrochloric acid is used in sore throat. It quenches thirst by reflexly evoking secretion of saliva, thus moistening the mouth. Like other acids it stimulates the mucous, intestinal and other alkaline secretions. It is the special acid of the gastric juice. It aids digestion and is principally used for

this purpose. It overcomes acidity of stomach when administered before meals, as evinced by animals licking walls, especially white-washed walls, eating dirt, etc. It is useful to give young calves or foals which are digesting their food in an indifferent manner and scouring. Where there is an over secretion of acid it should be given before meals. For other forms of indigestion it is best given after feeding. It sometimes acts as a vermifuge, especially with iron. It acts on the liver and is used in low fevers.

Externally.—It is used on warts, as an antiseptic for wounds, foot-rot in sheep, and occasionally as a styptic. The dilute hydrochloric acid is very useful for dissolving diseased bones as in cracked jaws; keep applying the acid until the loose fragment of bones become loose enough to be removed either by the hand or forceps.

Nitro-muriatic acid is especially useful for torpidity of the liver and intestines. It being tonic and stimulant to the skin, liver and intestinal glands. It is used in chronic hepatitis and certain cases of pneumonia; where the conjunctiva is yellowish, showing that the liver is torpid, also used in chronic diarrhœa and scouring, when due to dyspepsia (intestinal), and is often administered in any of the forms of indigestion. It is the acid most used for internal administration, besides the aromatic sulphuric acid. It should always be made up fresh, and the dilute nitro-muriatic acid used.

For hepatic or enteric influenza:

℞ Quin sulph ʒ i.
Tr. Ext Nucis Vomica, ʒ i.
Tr. Capsici ʒ iij.
Ac. Hydrochloric dil. ʒ iv. ss.
m. Sig.—1½ tablespoonful in water every three hours.

Acidum Nitricum—Nitric Acid.—Common name aqua-fortis. Properties, a colorless fuming very caustic and corrosive liquid of a peculiar somewhat suffocating odor, and a strong acid taste and reaction, contains 68 per cent absolute acid. The full strength acid is seldom given.

Acidum Nitricum Dilutum—Dilute Nitric Acid.—It is 10 per cent strength.

Doses.—Horses, 2 drs. to 1 oz.; cattle, 4 drs. to 2 ozs.; sheep and pigs, 15 to 30 m.; dogs, 3 to 20 m.

Antagonists and Incompatibles.—Toxicology and antidotes, the same as all other mineral acids.

Physiological Action.—Irritant and corrosive, especially destructive when used in concentrated solution. It leaves a tan yellow or brown stain on the skin. It is an oxidizing agent, and is especially used as a hepatic stimulant and tonic.

Therapy.—Useful in horses convalescing from influenza and other debilitating disease; also in torpor of liver.

Externally it is used on warts, chancres, ulcers, fungus and malignant growths to remove hardened and thickened skin, as in mallenders and sallenders, as a caustic in poisoned wounds, foot-rot, caries, etc. When used for this purpose, protect the surrounding tissues by greasing. Freely dilute with water; it abates itching of nettle-rash (1 in 200).

Acidum Phosphoricum—Phosphoric Acid.—Full strength is 85 per cent acid, colorless, sour syrupy liquid. Dilute acid 10 per cent. It is not so corrosive as other mineral acids and is thought not to be so apt to derange digestion as the others when long continued. It is a nerve tonic, anti-phosphatic, aphrodisiac and anti-febrile. Very useful to stop thirst of diabetics. It is given in febrile disease as a tonic and refrigerant, in nervous diseases, jaundice, dyspepsia, etc.

Dose - For horse, 2 dr. to 1 oz.; dogs, 2 to 30 m.

It is often prescribed as a tonic combined with nux vomica, Tr. chloride of iron, gentian, or any of the stomachics.

℞		
	Acidi phosphoric dil.	℥ iv. ss.
	Fl. ext. nucis vomica,	℥ j. ss.
	Tr. ferri chloridi	℥ vj.
	Fl. ext. gentian rad. q. s. ad.	℥ xxiv.

m. Sig.—2 oz. 3 times daily in ½ to 1 pint water.

Recapitulation of Mineral Acids.—They are: 1, sulphuric; 2, hydrochloric; 3, nitric, and 4, phosphoric, with their combinations of aromatic sulphuric acid and nitro-muriatic acid. They are all escharotics, abstracting the water from the tissues, combining with the bases, destroying the protoplasm, and are very diffusible.

Sulphuric carbonizes, stains tissues black.

Nitric stains tan or yellow.

Hydrochloric, leaves a whitish film.

Nitric promotes secretion.

Sulphuric lessens secretion.

Hydrochloric does neither.

Nitro-hydrochloric acid acts especially well in treating dyspepsia, as it combines the action of both acids, aids stomach digestion by virtue of its hydrochloric acid mainly.

Aromatic Sulphuric Acid.—Is especially good in indigestion, accompanied by diarrhœa on account of its astringent action and the aromatics which it contains.

To the mouth of ducts having an acid secretion, they check the flow, to those of alkaline secretion they promote it.

Fermentation is stopped by the mineral acids. Bowels are constipated by sulphuric, and relaxed by nitric acid. As they are synergistic to pepsin they at first aid digestion, but if continued long they lessen the production of gastric juice and so impair digestion. Given before meals in small doses they relieve excessive acidity of the stomach, by checking production of the acid gastric juice.

Poisoning by them is treated by alkalies as carbonate or bicarbonate of soda, magnesia, chalk, and soap, to neutralize the acid. Empty the stomach first (when possible) then give demulcents as oil, albumen, milk, etc. to protect the mucous surfaces. If prostrated give stimulants, ad aq. ammon. intravenously, etc. Do not use water in antidotal agents for sulphuric acid.

Therapy in General.—They are used in:

1. Atonic dyspepsia, best treated with hydrochloric acid after meals; also combined with pepsin.
2. Acidity of the stomach, hydrochloric or phosphoric acids before meals.
3. Low fevers, hydrochloric or phosphoric acids.
4. Oxaluria, nitric, or nitro-muriatic acids.
5. Chronic liver disorder, nitro-hydrochloric acid.

Diarrhœa and dysentery, when with profuse secretions, use the sulphuric or aromatic sulphuric acid with opium.

7. Lead poisoning, give sulphuric acid to form sulphate of lead which is insoluble.
8. Hæmorrhoids or piles, use sulphuric acid.
9. Hæmorrhage of uterus, sulphuric acid dilute.
10. Hæmorrhage of purpura hæmorrhagica, sulphuric acid dilute.
11. Thirst of diabetes, phosphoric acid.

Local Use.—Ulcers and growths, nitric acid full strength; applied with glass rod.

Diseased bone, dilute hydrochloric acid.

The average dose of all the mineral acids.—Horse, 2 to 4 drs.; cattle, 3 to 6 drs.; sheep and pigs 10 to 30 M.; dogs, 3 to 10 M.

These are for the dilute acids which are prepared for internal use.

OILS AND FATS.

1. ADEPS LARD.—Used as base for ointments. A lubricant, emollient and demulcent, and an antidote for poison, of any caustic substance, also for horses and dogs, in chest and throat diseases; applied hot.

When you want a substance to penetrate, use lard as it is easily absorbed by the tissues.

2. ADEPS BENZOINATUS, BENZOINATED LARD.—Use as base for ointments, lard 1000 parts, benzoin 20 parts.

3. ADEPS LANÆ HYDROSIS, LANOLIN.—Purified fat of the wool of sheep, mixed with not more than 30 per cent of water. It will absorb its own weight of water, is very penetrative and does not get rancid.

Good lanolin should be white or nearly so, most of the lanolin in this country is a dirty yellow, owing to its impurity. It is used as a base for ointments when the medicine is to be absorbed.

It also allays the itching of skin diseases, especially when combined with sub-nitrate of bismuth.

4. SEVUM, SUET.—Abdominal fat of sheep. It is used as a base for ointments when they are wanted to be stiff.

5. OLEUM AMYGDALÆ EXPRESSUM—ALMOND OIL.—A fixed oil obtained from the sweet almond. It is combined with other drugs in itching skin disease.

6. OLEUM THEOBROMATIS.—Common name, CACAO BUTTER. It is the oil from the kernels of the fruit of the theobroma cacao, used as a base for suppositories.

7. OLEUM OLIVÆ—OLIVE OR SWEET OIL.—Used as a demulcent, emollient and laxative. It is a solvent for iodoform.

8. OLEUM GOSSYPII SEMINIS—COTTON SEED OIL.—A fixed oil expressed from the seeds of cotton and subsequently purified.

It is used as a nutrient and tonic; also used instead of olive oil.

℞ Olei Sinapis, ℥ i.
Aq. Ammon. Fort, ℥ i.
Ol. Gossypii. Sem. ℥ iv.
m. Sig.—Apply externally for chest and throat disease.

It is the best counter-irritant to use in pneumonia, as it does not remove the hair; the oil can be used the same as cod-liver oil, as a laxative, nutrient and tonic.

The seeds in the south are used to fatten cattle.

9. Petrolatum (Vaseline or Cosmoline).—A semi-solid substance, yellowish, fat-like mass, obtained from petroleum, rock-oil or coal-oil. It is used as an emollient, and as a base for ointments. It has some antiseptic properties, and is used as a protective as well as a healing agent.

10. Oleum Morrhuæ - Cod Liver Oil. – A fixed oil obtained from the fresh livers of codfish; has a pale yellow color, is official and said to be the best for nutritive purposes. Cod-liver oil is often adulterated with the oil of other fish.

Action and Uses. – Nutrient, tonic and alterative; on account of its biliary constituents is easily emulsified and digested. It is indicated in all cases of malnutrition and where digestive organs are weak; also in animals recovering from debilitating diseases, strangles and influenza. It is good in catarrh and bronchitis, as it appears to furnish suitable material for repair of the inflamed mucous membranes.

Like other oils it relieves broken wind, and is given to the human in consumption. It is particularly used for the smaller animals. It is given to dogs and cats during distemper, also in eczema, epilepsy, chorea, rickets and chronic rheumatism. Average dose for animals:

Horses, 2 ozs.; sheep, 1 oz.; dogs, 1 to 4 drs.; cattle, 2 to 4 ozs.; pigs, ½ to 1 oz.; cats, 1 dr.

Give two to three times daily.

Linum, Flax or Linseed.—1. Lini Farina, flax-seed or linseed meal.

2. Oleum lini, expressed oil of linseed.

3. Linseed cake, oil cake, used as food. From the stem of the plant we get lint and tow. The seeds crushed, ground and under hydraulic pressure yields linseed oil. The residue is called linseed or oil cake and is a valuable article of food for horses and cattle. Linseed oil for medicine should always be used raw.

Action and Uses.—It is nutrient, tonic, laxative, emollient and demulcent.

Linseed meal and the cake are valuable food stuffs, in small quantities. It is 2½ times as fattening as starch or sugar. It causes the coat to become slick and glossy and induces shedding in the spring, but is very heating in summer.

Linseed gruel is a good food, being palatable and easily digested, for horses, cattle and sheep, not only good in health, but in debilitating diseases, also in chronic skin troubles. It acts in such cases both as food and medicine.

In febrile diseases horses will often sip or drink cold linseed tea (2 ounces to 1 pint of water) when they will not touch anything else. When a patient is exhausted, the linseed tea is given with milk, eggs and whisky. Horses that are bad feeders, having harsh, scurvy skins, or being affected with roaring, thick wind or heaves, are usually much benefited with linseed in some form. Give about one pound of the cake daily.

For young herbivorous animals living on skim milk, it is a valuable adjunct, furnishing the requisite fatty matter.

A mucilaginous demulcent, or a decoction in the proportion of about 1 to 2 ozs. to a pint or 1½ pints of warm water, is useful in irritable conditions of the throat, alimentary canal, kidneys and bladder; also in poisoning by irritants and corrosives and as a vehicle for nauseous and acrid medicines. The oil may be used for the last two. For linseed poultices, take the best grade of linseed meal, pour hot water over it until it becomes pasty. Charcoal and antiseptics are often mixed with it. When used as a poultice on the foot in nail pricks, always put on a poultice that will cover the whole foot.

Linseed-Oil.—Cannot be used as a diet on account of its being too laxative; it is laxative in small doses, but in large doses produces copious discharges of fæces, having a distinct linseed-oil smell. The oil is also emollient, soothing, and softening to inflamed and indurated surfaces.

For burns and scalds the well known carron oil, composed of equal parts of linseed oil and lime-water, cannot be surpassed. This oil is also used as a vehicle for acrid medicines and to act as a protective to the alimentary tract in poisoning or corrosive drugs, also to sweep them out. As a laxative it usually produces tolerably full and softened evacuations, without nausea, griping

or superpurgation and with a decided odor of the oil. It is the best physic to administer to pregnant animals and in irritable conditions of the bowels; also in cases of influenza, purpura and other debilitating diseases, where the usual purgatives would be too severe, irritating and exhausting. It is also used as an enema; 2 to 4 ozs. of the oil or meal given daily in mash often suffices to maintain the bowels in a relaxed condition throughout febrile attacks, where there is a tendency to constipation. An ounce or two of oil given daily often relieves broken wind in horses.

It is the best purgative for all young or weakly animals. Equal parts ol. lini and castor-oil is very effectual for dogs. As a lubricant and emollient the oil relieves choking.

The oil mixed with Goulard's extract makes a good dressing in scaly skin disease.

℞ Liq. Plumbi Sub. Acet., ℥ ii, to iv.
Oleum Lini, Oj.

This is a fine mixture for skin disease, scratches, grease or cracked heels.

Dose as a full cathartic.—Horse, takes 1 to 2 pints; as a laxative, ½ to 1 pint; cattle, 2 to 4 pints; sheep and pigs, 5 to 10 ozs.; dogs, ½ to 3 ozs.; cats, 1 dr.

It may be fed to horses mixed with bran mash, also to foals and calves in proportion to their age.

PHOSPHORUS.

A translucent nearly colorless solid, resembling wax, without taste but having a peculiar smell. It should be kept under water in a cool place and protected from the light, for when brought into the air it bursts into a flame. It is insoluble in water, but very soluble in olive-oil and ether, also soluble in most all the oils.

Dose.—Horse, ½ to 2 or even 4 grs,; cattle, 1 to 5 grs.; sheep and pigs, about 1-100 gr. to 1-50 gr.; dogs, 1-200 of a gr. to 1-100 gr.

Always start with the smallest dose and gradually and cautiously increase the size. Give it in some protective vehicle, as an electuary or dissolved in oil, vaseline or glycerin.

Synergist.—Oils and fats favor its absorption and should never, therefore, be employed in case of poisoning with phosphorus. Arsenic is a synergist and sulphur also.

Antagonists and Antidotes.—In case of poisoning, empty the stomach with emetic or pump, and administer mucilaginous fluids but NO oils, use milk, eggs, slippery elm tea, and oil of turpentine, but the best is sulphate of copper, which acts as an emetic, and forms insoluble phosphide of copper. Give lime-water and charcoal to protect the tissues.

Physiological Action.—It is an alterative in bone diseases as it promotes the growth of bone. Antirachitic, aphrodisiac, a brain and nerve tonic, irritant, promotes tissue growth, replaces spongy texture of bone with denser or more compact tissue, and stimulates the central nervous system.

Uses.—It is indicated in osteoporosis, rickets, osteomalacia, chronic nervous exhaustion, chorea, pernicious anæmia, sexual weakness, and locomotor ataxia. It is a most potent drug in threatened softening of the brain. It is sometimes used instead of arsenic in chronic skin disease, but arsenic is the best. It is sometimes used in paralysis as a local irritant; but I do not recommend it for this. Phosphorus 1 part, olive oil 100 parts, as an irritant. It is recommended in osteoporosis.

Toxicology—Externally.—It inflames the skin and may even cause gangrene. Internally will cause gastro-enteritis, diarrhœa and emesis (in those that can vomit), 15 grs. in horses and cattle cause gastro-enteritis. Large doses, such as 30 grs. in horses and cattle, and ½ to 1 gr. in dogs and men, produce paresis, convulsions, coma and death, usually within 2 or 3 days. Paralysis of the heart may cause sudden death.

Moderate to full doses repeated several times daily may within a few days produce fatty degeneration of the albuminoid tissues or hypertrophy of connective tissues and acute cirrhosis. Persons working in match factories or with phosphorus constantly are liable to suffer from necrosis of the lower or upper jaw. Slow phosphorus poisoning will cause cirrhosis of the liver. In poisonous doses it destroys the red blood corpuscles, causing acute hæmorrhages from fatty degeneration of the arterial walls, fatty degeneration of the stomach, liver and heart, with deep jaundiced condition, sometimes within 36 hours. This is followed with delirium, convulsions, coma, and death generally from gradual failure of both respiration and circulation. It is excreted by the kidneys and lungs, chiefly as phosphorus and phosphoric acid.

COMPOUNDS OF PHOSPHORUS.

ZINCI PHOSPHIDUM—PHOSPHIDE OF ZINC.—Dose for horses, 1 to 3 grs.; dogs 1-50 to 1-30 of a gr., or 1-10 gr. for very large dogs.

This preparation is irritating and must be administered with a demulcent the same as phosphorus. It is used by some instead of phosphorus. It occurs as a gray, friable mass, with metallic luster, and contains 24 per cent phosphorus.

OLEUM PHOSPHORATUM—PHOSPHORATED OIL—Prepared by dissolving phosphorus in ether and almond oil, 1 part of phosphorus to 100 parts of the menstrum. Each 100 drops of phosphorated oil contains 1 grain of phosphorus.

Dose for horses, 1 to 3 drs.; sheep and pigs, 10 to 30 m.; cattle, 2 to 4 drs.; dogs, 1 to 3 m.

This is a good form for administering phosphorus for rickets in dogs:

℞ Ol. Phosphoratis, mxvj.
Ol. morrhuæ, ℥ iv.
M. Sig.—Teaspoonful four times daily.

PILULÆ PHOSPHORI—PILLS OF PHOSPHORUS.—Each pill contains about $\frac{1}{100}$ of a grain. A good form for administration to sheep, pigs and dogs. One to three pills for dogs.

PHOSPHITES AND PHOSPHATES.

CALCII PHOSPHAS PRÆCIPITATUS—PRECIPITATED PHOSPHATE OF LIME.—Known as bone phosphate, a light, white, amorphous powder, permanent in the air, odorless, tasteless and insoluble in water or alcohol, but soluble in lactic or hydrochloric acid in small quantities. It is given in fracture of bones to hasten process of repair; also in osteoporosis or any disease where the growth of bone is desired. It must be given in small doses or it may cause calculus.

Doses.—Horses 2 to 4 drs., or even 1 oz.; cattle, ½ to 2 ozs.; colts 1 to 4 drs.; lambs, 10 to 30 grs.; sheep and pigs, ½ to 2 drs.; calves, 2 to 4 drs.; dogs, 5 grs. to ½ dr.; given along with other tonics. If an ounce is given at a dose don't give it over twice a day, as a large dose is apt to derange the bowels and produce concretions.

SODII PHOSPHAS—PHOSPHATE OF SODA.—Large, colorless, transparent, monoclinic prisms, speedily effloresing on exposure to air. That is, it loses its water of crystallization and becomes

somewhat changed. It is odorless and has a cooling, saline and feebly alkaline taste and a slight alkaline reaction. It occurs also and is best used in the form of a granular salt.

Soluble in 480 parts water at 60° F., and in two parts of boiling water. Dose—Horse, 3 to 10 ozs., except when you intend to repeat it as a laxative. One-half to 2 ozs. every 2 hours to relieve hepatic colic for which it is a most excellent drug. Give foals and calves 1 dr. to 2 ozs.; sheep and pigs, ½ drs. to 1 oz.; dogs, ½ dr. to 1 oz.

Used more especially in young animals suffering from deranged liver; also the effect of being weaned, improper food and whey fed animals.

Syrup's Calcii Lactophosphatis—Syrup of Lacto Phosphate of Lime.—Useful in weakly young puppies as it is already dissolved and easily absorbed. Dose, ½ M^s to 1 dr., 3 times daily. Lactic acid makes the phosphate of lime much more soluble.

Physiological Actions.—In general they are used as alteratives and nutrients in disease of malnutrition. Phosphate of lime is an essential ingredient of all the tissues forming more than 90 per cent of bone giving it solidity. It increases the alkalinity of the blood, and slightly diminishes the excretion of urine. Used especially where the development of the bone is imperfect, also in osteoporosis, osteomalacia, rickets, caries, nutrition of bone, in delayed union of fractures. It hastens repair of fractures and diminishes the formation of bone callosities, prolonged suppuration, anæmia, and chronic diarrhœa.

The Phosphate of Soda.—Acts similarly on the blood and nerve, increasing secretion, especially that of bile, being an excellent hepatic stimulant, it is used in hepatic colic in horses, due to congestion of liver, jaundice, sclerosis of the liver and in constipation due to lack of biliary secretion.

Difference Between a Phosphide, a Phosphate and a Phosphite.

A phosphide is formed by direct union of phosphorus with a base.

A phosphate is formed by the union of phosphoric acid with a base.

A phosphite is formed by the union of phosphorus acid with a base. A base may be soda, zinc, copper or any other substance.

Whenever a salt ends in "IDE" it is formed by the union of an element with a base, (thus iron oxide, iron and oxygen, iron phosphide, iron and phosphorus, etc.) Whenever a salt ends in "ATE" it shows the union of an acid ending in "ic" with a base. (Thus, iron phosphate, iron and phosphoric acid, iron sulphate, iron and sulphuric acid, etc.) When the salt ends in "ITE" it is composed of an acid ending in "ous," and a base (thus, sodium sulphite, sodium and sulphurous acid.)

IRON AND ITS PREPARATIONS.

As there are 42 official preparations of iron, and 7 or 8 more unofficial preparations, quite a few of them are impracticable for use in veterinary practice, consequently we will give only those which are practicable for our use. They nearly all have the same action only to a different degree. Some are more irritating than others and some have special actions due to other drugs combined with the iron.

FERRI CARBONAS SACCHARATUS.—A greenish gray powder, odorless, having at first a sweetish, slightly ferruginous taste. It is only partly soluble in water.

Doses.—Horse, 1 to 3 drs.; sheep and pigs, 10 to 20 grs.; dogs 3 to 10 grs.; It is used when the stomach is irritable.

FERRUM REDUCTUM—REDUCED IRON—POWDERED IRON.—Doses, human, 3 to 6 grs.; horse, 1 to 3 drs.; dog, 1 to 5 grs. It is used on account of its being non-astringent and non-irritating to the stomach.

FERRI SULPHAS—SULPHATE OF IRON.—Known as copperas, bluish gray crystals, which on exposure to the air, effloresces and changes its color, is wholly soluble in 1 and ½ times its quantity of water. It is also called green vitriol and copperas. Dose, a little more than the exsiccated sulphate.

It is an astringent, hæmatinic (blood tonic) and disinfectant. On account of its effloresceing tendency, it should be kept in bottles with glass stoppers.

FERRI SULPHAS EXSICCATUS—DRIED SULPHATE OF IRON.—A greenish white powder soluble in water with the exception of a small residue. It is the best form of powdered iron, used in veterinary practice for large animals, except when the stomach is irritable, then the milder preparations, such as the carbonates, are preferable.

Dose.—Horses, ½ to 1 dr.; pigs, 5 to 15 drs.; lambs, 1 to 4 grs.; colts, 10 to 15 grs.; cattle, 1 to 1½ drs.; calves 10 to 20 grs.; sheep, 8 to 20 grs.; dogs, ½ to 2 grs.

Syrupus Ferri Iodidi.—A yellowish or greenish yellow liquid with a sweet, inky taste.

Dose.—Horse, 1 to 2 ozs.; dogs, 10 m. to 1 dr.

Given where you want the combined action of iron and iodine. Action: Tonic, alterative, diuretic and emmenagogue.

Ferrum Oxidum Hydratum—Hydrated Oxide of Iron—Used internally and only as an antidote for arsenical poisoning. It has a reddish brown color, should be administered in the form of a soft mass, and must be made up fresh. Human dose, a tablespoonful every 5 or 10 minutes until the symptoms of poisoning have subsided.

Tinctura Ferri Chloridi—This is a solution of chloride of iron in alcohol, with some free hydrochloric acid.

Dose.—Horses, 2 drs. to 1 oz.; sheep and pigs, 10 to 30 ms.; lambs, 3 to 10 ms.; cattle ½ to 1½ ozs.; calves, ½ to 2 drs.; dogs, 2 to 20 ms. All the preparations of iron should be diluted with water or oil; this is the best liquid preparation of iron for our use. Powdered forms of iron should be diluted with some non-irritating powder.

Ferri Phosphas—Phosphate of Iron.—Occurs in bright green, shining scales.

Dose.—Horse, 1 to 3 drs.; sheep, 10 to 30 grs.; pigs, 5 to 20 grs.; puppies, ½ to 3 grs.; colts 15 grs. to 1 dr.; lambs, 2 to 10 grs.; dogs, 5 to 10 grs. It is soluble in water. Most often prescribed in anæmic, rickety young animals.

Syrupu Ferri, Quininæ et Strichninæ Phosphatum—Syrup of Phosphate of Iron, Quinine and Strichnine.—Contains $\frac{1}{15}$ gr. of strychnine to 1 fluid drachm of syrup, $1\frac{2}{3}$ grs. quinine and $1\frac{1}{8}$ of iron phosphate. It is a very good general tonic for dogs and other animals. The dose for dogs varies from ½ to 2 drs.

Liquor Ferri Sulphatis—Monsel's Solution.—A solution of sulphate of iron, sulphuric and nitric acids. It is an inodorous, syrupy liquid of a ruby red color, having an extremely astringent taste, somewhat caustic and mixes with water and

alcohol in all proportions without decomposition. This is used almost entirely for external use as an astringent or styptic.

Ferri Subsulphatis—Monsel's Powder.—It is used as a styptic.

Ferri Arsenite—Iron and Arsenic.—Prescribe your own in proper proportion, as:

℞ Tr. Ferri Chlor.
Liq. Potas. Arsen. aa. ℥ xii.
M. Sig.—℥ i. T. I. D. in Aqua 1 pt.

As internal treatment, particularly before and after trephining for catarrhal discharges.

Ferrum Dialysatum.—Useful in Arsenical poisoning.

Antagonists and Incompatibles.—Iron is incompatible with acids and acidulous salts and vegetable astringents. The tincture of the chloride of iron can be combined with acids, but is incompatible with alkalies as lime-water and magnesia.

Synergist.—All agents promoting constructive metamorphosis are synergistic to iron; as food, the simple aromatics, and astringent bitters, cinchona, manganese, bismuth, etc.

Physiological Actions.—In general, metallic iron is dissolved in the acids of the stomach, enters in combination with them and (although inert as pure iron) acquires molecular activity. The iron is partly absorbed by the stomach, probably as an albuminate, and partly in the intestinal canal. The stools become brownish and even black, due to the iron, which has not been taken up by the system and is thus eliminated; this is especially shown where larger doses than necessary are administered. Iron is not a foreign substance to the organism, it being constantly present in the blood, gastric juice, chyle, lymph, bile, pigment of the eye, and traces of it in the milk and urine. In man there is 1 part of iron to 230 red blood corpuscles, and in cattle 1 to 194 red globules, as (oxide). It exists either in combination or as metallic iron, (opinions differ), in the hæmatin, (coloring matter of the blood). That it performs a very important part is shown in the rapid construction of red globules when iron is administered in anæmia, without it hæmatin is not formed, and red globules diminish in number. By its medicinal use we furnish to the blood a material which it needs. The physiological action of iron is not limited merely to the construction of red blood. It also promotes the appetite and invigorates the digestion, when there is no intolerance to its presence in the stomach. By increasing the disposition for

food and the ability to dispose of it, iron acts as a stomachic tonic, consequently when given in the healthy state or when administered for too long a period during disease, the gastric glands become exhausted by over stimulation, then it is said that the iron disagrees. Being a restorative its use is contra-indicated in a condition of plethora (fullness of the blood vessels). In large doses the soluble preparations of iron give rise to nausea and vomiting, some of them possess more or less toxic activity. The iodide and chloride, nitrate and sulphate are the most active. Alarming symptoms, or even death may result from over doses. Extreme doses will produce gangrene of stomach and intestines. Certain of the salts of iron, as the sulphates, nitrates and chlorides, possess a high degree of astringency, hence they produce constipation, when taken internally. When brought into contact with the blood, they coagulate it, forming a tough brownish magma, and as the albuminous elements of the tissues are also solidified, they are powerful hæmostatics. Iron is eliminated chiefly by the intestinal route, partly by the liver into the bile, thence into the intestines, some by the kidneys also. The tincture of the chloride, being especially diuretic.

Summary.—Iron in general is a hæmatinic, stomachic, styptic, astringent or hæmostatic.

The tincture chloride in addition is diuretic.

The sulphate is in addition vermicide.

The iodide is alterative and resolvent as well as tonic.

The Syr. Ferri Bromidi is sedative as well as tonic in nervous diseases.

A drug used in combination with iron may modify or enhance its action.

Therapeutical Application.—Iron arsenite has been used in chronic skin diseases for emaciated patients in about the same doses as arsenic, but the best way is to prescribe iron and arsenic combined as: Tincture chloride of iron and Fowler's solution in proper dosage. Citrate of iron and quinine conjoin the tonic properties of its components, and is used for dogs and small animals. It is best to prescribe proper doses of each. Dose of Ferri et quininæ citratis for dogs, 3 to 6 grains.

The phosphate of iron is serviceable in disease of bone, diabetes and nervous exhaustion. Especially good for delicate dogs

and thriftless foals, when they are said to be weak in the bones, osteoporosis and other bone diseases.

For colts 2 or 3 years old:

℞
Ferri Phosphatis, ℥ iss.
Calcii Phosphatis præcip, ℥ iii.
Pulv. Nuc Vom., ℥ vi.
Pulv. Gentian Rad., ℥ iss.
M. Ft. Chart No. 12. Sig.—1 powder 3 times daily.

Rickets in puppies.

℞
Iron Phos., grs. iiss.
Lime Phos., grs. v.
Nux. Pulv., grs. ss.
Gentian pulv. grs. ii.
M. Sig.—For one dose.

The Saccharated carbonate is staple, non-irritating to the stomach, and especially suited to dogs. It has the same uses as the sulphate. It is also used for the other animals when the stomach is weak:

The Sulphate of Iron.—Used locally as an astringent, and internally as a hæmatinic and tonic in anæmia. It improves the appetite and abates exhausting discharges in nasal gleet, leucorrhœa, atonic torpidity of bowels. Prescribed with aloes; also in the same way for intestinal worms. Combined with iodine it is the best prescription for diabetes insipidus:

℞
Sulphate of iron, ℥ i.
Resublimed iodine, ℥ i.
M. Sig.—Give twice a day.

It is also used in early signs of liver rot in sheep. Chorea and epilepsy when with anæmia, are benefited by iron. Combine iron and arsenic for chorea, septicæmia, pyæmia and all forms of blood poisoning, as pupura hæmorrhagica, scarlatina, etc., with quinine. The tincture chloride is prescribed in blood poisoning. In red water of cattle, after bowels are freely opened. In convalescence from debilitating diseases it is a valuable tonic, conjoined with other remedies as nux. quinine. etc. Such diseases as influenza, lung diseases and chronic catarrh should be followed with iron and other tonics.

Representative prescription for general tonic.

℞
Ferri. Sulph Ex., ℥ i. to iss.
Quinine Sulph., ℥ ss.
Pluv. Nucis Vom., ℥ iss.
Gentina Rad. ℥ iii.
Pot. Nit. ℥ iss.
M. Ft. Chart No. 12. Sig.—One powder 3 times daily.

Iron Iodide.—Is used when an alterative as well as a tonic

action is desired. Besides being used for the same purpose as sulphate, it is given to promote the absorption of glandular enlargements in young and weakly animals, and in swelling of the joints. It is useful in polyuria or diabetes insipidus, also nasal gleet.

The Tincture Chloride of iron acts as a hæmatinic tonic, antiseptic, astringent, styptic, diuretic and local irritant or caustic. It is serviceable in most cases in which the sulphate is recommended. It is used in atonic dyspepsia and for the removal of intestinal worms, in relaxed and sore throat, in proportion of 2 to 4 drs. to every pint of water for animals.

℞		
	Tr. Ferri Chlor.	℥ ss.
	Pot. Chloratis,	℥ i.
	Glycerini,	℥ ii.
	Aqua qs. ad.	Oj.

M. Sig.—℥ i. every two or three hours as a gargle for sore throat.

Also used in anæmia and in blood poisoning combined with quinine. It also promotes absorption of inflammatory material when associated with debility and anæmia. It is the most serviceable preparation of iron for influenza, purpura and scarlatina, as it has a tonic effect on both the blood and arterioles. In these cases it is prescribed with turpentine, quinine and oil. It is used in rheumatism in weakly patients alternated with salol, salicylic acid or salicylate of soda. Also used as an astringent and stimulant for the genito-urinary mucous membrane. The tincture being excreted by the kidneys, is preferred to watery solutions. It is particularly suited for distemper and rheumatic lameness in weakly dogs. Iron alternated with arsenic is useful in chorea, also in chronic diarrhœa, epilepsy, erysipelas, albuminuria and diphtheria.

Externally.—It is an antiseptic, astringent and styptic. It coagulates albumen. Diluted with 6, 8, or 10 times its quanity of water, it is used for uterine hæmorrhage, and is occasionally injected into fistulous openings. Iron is regarded as a specific for erysipelas. It is given both internally and used externally. 1 oz. to 1 pint of oil injected into the rectum will destroy and bring away rectal worms.

Monsel's solution and powder are used almost entirely to check hæmorrhage. Pour it on the wound or apply with a sponge.

Ferri Oxidum Hydratum is used internally as an antidote for arsenical poisoning, must be made up fresh and given in a

soft condition. The dose for the human is ½ oz. every 5 or 10 minutes. Add aq. ammonia 8 parts to a solution of sulphate of iron 10 parts, which will precipitate the iron from the solution, then strain through a cloth, you then have hydrated oxide of iron.

Administration of Iron.—The fluid preparations should be freely diluted; the solid preparations should be combined with protectives or inert remedies, either in powder or pill form, or with stomachics as gentian rad. Iron causes less gastric irritation, and enters the blood more readily if given with or immediately after meals. In anæmia it should be given in increased doses. Overcome constipation by giving, when necessary or combining iron with laxatives as linseed oil.

MANGANUM-MANGANESE.

This drug and its salts are inferior to iron. The only preparation of importance is,

Pot. Permanganas—Permanganate of Potash.—Needle shaped crystals of a deep purple color; soluble in 20 parts cold waterand three parts boiling water, the solution having a deep purple or rose color, according to the amount of salt in solution. Distilled or boiled water should be used.

Dose—Horse, ½ to 1 dr.; pigs, 3 to 6 grs.; cattle, 1 to 1½ drs.; dogs, ½ to 3 grs. It is seldom used internally, but has been administered as an alterative and febrifuge; externally it is used as a deodorant, astringent and antiseptic; it is very powerful in its action.

Antagonists and Incompatibles.—Salts of lead, silver, mercury and the caustic alkalies are chemically incompatible. They decompose the alkaloids.

Action and Uses of Potassii Permanganas.—It is a powerful oxidizing agent and readily yields up its oxygen in the form of ozone; hence it is an antiseptic and deodorizer. Full strength it is a mild caustic. Diluted it is astringent.

It is used to deodorize and disinfect foul smelling wounds, the nostrils in ozæna, nasal gleet, the mouth in apthæ, throat when ulcerated, diphtheria, the uterus in metritis, and retention of placenta, also to cleanse hands or instruments. It is sometimes used internally in flatulence, erysipelas, puerperal fever and septicæmia. It has been used successfully as a remedy for bites of poisonous snakes and other animal poisons, used locally

and internally. In the human it is used to promote the menstrual flow. Used in cancers, caries ulcers, abscesses, etc., and in foul smelling sheaths of horses. Strength for veterinary purpose, 1 drachm to ½ oz. to 1 pint of water. It is administered by the mouth or hypodermically for morphine poisoning. When given for this purpose the amount of the antidote should equal that of the poison taken. As an eye-wash use about 1 to 2000 or 1 to 1000 solution.

The Remedies Promoting Constructive Metamorphosis previously considered, are constituents of the body. Those now to be discussed act indirectly, by stimulating the organs concerned in blood making.

Bismuthum Subnitras—Subnitrate of Bismuth—A heavy white powder with a faintly acid odor and taste, insoluble in water. Is the only one used in veterinary practice to any extent.

Dose.—Horse, 1 to 4 drs., or even 1 oz.; dogs, 3 to 20 grs.

Bismuthi Subcarbonas—Cabbonate of Bismuth.—Insoluble. Same character, dose and uses as the subnitrate.

Bismuthi Salicylate, used mostly as dressing.

Bismuthi Subiodidum, used only as a dusting powder for wounds, ulcers, etc. Where an antiseptic and stimulant are required, it is said to be very good.

Bismuthi et Ammonia Citras.—Soluble in water.

Bismuthi Citras.—Insoluble.

Physiological Action.—The insoluble preparations, as the subnitrate and subcarbonate promote the appetite, increase the digestive power, and cause a gain in body weight. They are somewhat astringent and retard intestinal movements and produce constipation. As they are insoluble, or nearly so, they pass down the intestinal tract and are converted into sulphides causing the fæces to become a dark slate color. Toxic symptoms arise from the adulteration of bismuth with arsenic. They are astringent, antiseptic and sedative to mucous membrane and abraided skin. The subnitrate is the salt chiefly used. It allays irritation in dyspepsia, vomiting, and gastro-intestinal catarrh, or irritation from any cause, by virtue of its medicinal and mechanical action. It is used to relieve itching and burning of abraided skin and in skin diseases. For diarrhœa use bismuth and opii

combined. Being insoluble bismuth forms a coating over the bowel.

For itching skin diseases in dogs, the following prescription is recommended:

℞ Bismuthi subnit. ℥ ii.
Lanolin, ℥ i,
M. Sig.—Apply when necessary.

For Vomiting in dogs:

℞ Ac. Carbolici, m iii.
Bismuthi subnit, ℥ i.
Tr. opii camph., ℥ ss.
Glycerini, ℥ ss.
Aq. Cinnamoni qs. ad., ℥ jss.
Sig.—Teaspoonful every 2 or 3 hours.

Bismuth is best administered in milk.

ARSENICUM OR ARSENIUM—ARSENIC—(NOT USED IN MEDICINE.)

Acidum Arsenosum, Arsenous Acid, also called Arsenicum Alba.

This is dispensed as a heavy white powder. It is soluble in 1 to 100 parts cold water, and 1 in 20 parts boiling water; always stir in, while boiling. Shot is a mixture of metals containing 2 per cent of arsenic, and it is from the arsenic that benefit is derived in giving shot to a horse for heaves.

Dose of the arsenous acid.—Horse, 1 to 6 grs., cattle, 2 to 8 grs.; sheep and pigs, 1 to 2 grs.; dogs, $\frac{1}{60}$ to $\frac{1}{10}$ grs. Give well diluted.

Arseni Iodidum, Iodide of Arsenic.—An orange red, crystalline, solid, soluble in 7 parts water, used as an alterative in skin diseases. It enters into Donovan's solution.

Dose.—Horse, 2 to 6 grs.; pigs, $\frac{1}{7}$ to $\frac{3}{4}$ grs.; dogs, $\frac{1}{60}$ to $\frac{1}{10}$ grs. Give well diluted with some inert substance.

Liquor Acidi Arsenosi—Solution of Arsenous Acid.—The strength of all are about the same. This contains 4.56 grs. of arsenic to the oz. It is about the same as Fowler's solution, but more irritating and less reliable.

Dose.—Horse, 2 to 6 drs., ½ oz. 3 times a day is the average dose.

Liquor Arseni et Hydrargyri Iodidi, known as Donovan's Solution.—1 oz. contains about 4½ grs. (4.56) each of iodide of arsenic, and red mercuric iodide. It is an alterative in skin diseases, and should be kept in a dark place, and not used

if decomposed; that is if color is changed to a yellowish red and the odor of iodine is apparent.

Dose.—Horse, 2 drs. to 1 oz.; pigs, 15 to 45 Ms.; dogs, 2 to 10 Ms.= ½ oz., is the average dose for a horse given 3 times daily.

Liquor Potassii Arsenitis—Fowler's Solution—This is the preparation most commonly used. A solution of potassium arsenite, contains arsenous acid 1 part, potassium bicarbonate 1 part, compound spirits of lavender 3 parts and distilled water 95 parts.

Dose.—Horse, 2 drs. to 1 oz.; cattle, ½ to 1½ ozs.; sheep and pigs, 10 to 45 Ms.; dogs, 2 to 10 Ms. Average dose for horse ½ oz. usually given 3 times daily in drinking water or bran mash.

Liquor Sodii Arsenatis.—A solution of arsenate of soda, known as Pearson's Solution, about the same strength as Fowler's Solution, 4½ grs. to the oz. but it is less active. Dose about double that of Fowler's Solution. It is better to administer arsenic in solution than to give the solid arsenous acid, and Fowler's Solution is the best; Donovan's Solution may prove efficacious in chronic skin troubles, where other preparations will not benefit, also in nasal catarrh. Give small doses at first and then increase, unless very small doses are taken for its action on the stomach, to increase appetite and digestion by virtue of its irritant properties. Arsenic had better be administered after meals and well diluted in water or bran mash.

Antagonists and Incompatibles.—The salts of iron, magnesia, lime, and astringents, are chemically incompatible. The hydrated oxide of iron, or as it is also known, hydrated sesquioxide of iron, freshly made and in soft magma is the antidote to arsenic. Give dogs from ½ to 1 tablespoonful every 5 or 10 minutes. From 8 to 20 grs. of the antidote are required to each grain of arsenic swallowed, (when it can be determined). The stomach should first be evacuated, and then give the antidote, and follow with demulcents as oil, milk and mucilaginous drinks. Also give diluents, as weak alkaline water.

Iodide of Potash should be administered to promote elimination of the arsenic. In absence of the antidote, chalk, magnesia, and lime-water may be freely given. These agents act mechanically by enveloping the poison and preventing absorption. Dialysed iron is said to be quite efficacious as an antidote in doses of 5 to 15 Ms. for dogs.

Synergists are all those agents which promote constructive metamorphosis.

Physiological Actions—Gastro-intestinal and pulmonary tonic, a stimulant and alterative, acting especially on the digestive and respiratory mucous membranes and skin. It is antiperiodic and tonic; also antispasmodic, in nervous diseases and is a nervine tonic. In large doses it is a corrosive irritant poison, killing either by gastro-enteritis, or nervous paresis. Continued doses cause fatty degeneration. On account of its being a stomachic tonic small doses promote the appetite and digestion. Large doses inflame the stomach and derange digestion. It increases the cardiac action, respiratory power, and secretion of intestines. In man it stimulates the mind and sexual appetite, and causes rotundity of form and fair skin. It also increases peristalsis. When tolerance is established large doses are taken with impunity.

Externally.—Arsenic is very painful and excharotic, exciting violent inflammation. It is a caustic, antiseptic, and parasiticide, and is frequently used as a sheep dip. It is eliminated chiefly by the kidney, skin and saliva and in the milk of nursing animals.

MEDICINAL USES.

It should not be given in acute diseases. It is given as a general tonic after debilitating diseases, particularly when the lungs are involved, as in pneumonia, bronchitis and pleurisy. Arsenic combined with the feed is beneficial in stocking of the legs. As for its use in dyspepsia, other remedies had better be resorted to. It assists in the removal of worms. Useful in chronic diseases of air passages, as influenza. Relieves irritable chronic coughs, and roaring in early stages, as well as thick and broken wind, and heaves. As an alterative modifying tissue change, it is prescribed in early stages of tuberculosis, chronic rheumatism, chorea and epilepsy. It prevents periodically returning fevers. In anæmia it increases both red and white blood corpuscles.

Action on the Skin.—Administered internally it stimulates the dermis and hastens the removal of epidermal cells; hence it is useful in all chronic skin diseases, as chronic eczema, scab, mange and warts. To remove warts that sometimes come on the muzzle of horses, give internally and apply locally Fowler's solution full strength locally. In malarial disorders use:

℞ Fowler's solution, ℥ ss.
Compound Tr. Cinchona, ℥ i.
M. Sig.—℥ i. one dose. Repeat 3 or 4 times daily.

In skin diseases use Donovan's or Fowler's solution or acidum of arseniosi and sulphur mixed in the feed. Useful internally in successive crops of boils and in urticaria.

Externally.—The white arsenic or arsenous acid is used to slough out tumors, fistulæ, etc., but it is too painful. Prof. Williams recommends it in foot-rot. The affected sheep should be slowly driven through a trough containing a tolerable strong solution of arsenic. It is used for sheep to destroy ticks. In this way animals are sometimes poisoned, as it drips on the grass and other animals eat it. It is used to harden and dry specimens.

Toxicology of Arsenic.—Full medicinal doses if long continued, cause œdema and itching of the eyelids, increased flow of saliva, nausea, vomiting of mucous, diarrhœa or dysentery, weak heart, soreness to the touch over region of the stomach, itchy skin with small eruptions, jaundice and albuminuria. In long continued doses it diminishes oxidation, decomposes albuminoid tissues and produces fatty degeneration; also impairs the glycogenic functions of the liver. *In toxic doses* it causes two different sets of symptoms.

1st. Gastro-enteritis with shivering, retching, vomiting, thirst, straining, purging, with blood stools, violent colicky pains, quick weakened cardiac action, suppressed or bloody urine, strong and hard pulse at first, but gradually gets small, reduced temperature, general œdema, delirium, collapse, coma and death.

2nd. In the nervous form the first thing noticed is profound coma, like that of opium narcosis. Coma comes on suddenly without any gastro-intestinal symptoms.

Chronic Arsenical Poisoning.—Is common around tin and copper smelting work. The symptoms are indigestion, thirst, wasting, chronic disease of joints and bones, the knee joints swell, the animal gets lame, and hide-bound, hair falls off, skin gets scurfy, teeth get black and fall out and necrosis of the bones occurs.

POST-MORTEM APPEARANCES.

Stomach inflamed, mucous membrane reddened, softened, thickened and ulcerated in patches, ecchymosis. Same is formed in the intestines, according to the size of the dose.

Lungs congested, mucous membrane reddened.

Genito-urinary organs congested and inflamed.

Fatty degeneration of intestinal organs, especially liver and kidneys, same as in phosphorus poisoning.

In chronic poisoning the body becomes dry and mummified (embalmed), general fatty degeneration.

BITTERS.

Bitters are divided into simple and aromatic.

The aromatic bitters contain tannic and gallic acids, besides aromatic constituents, and are therefore more or less astringent.

The special bitters are eucalyptus, hydrastis, cinchona, etc., which will be treated of separately.

1st. Simple bitters contain no tannic and gallic acids, and can be combined with iron.

QUASSIA contains a crystallizable bitter principle, neutral in reaction. It is made from chips or shavings from a tall tree, 70 to 100 feet high that grows in Jamaica. Preparations:

EXTRACTUM QUASSIÆ—Extract of Quassia. Dose.—Horse, 20 grs. to 1 dr.; dogs, ¼ to 2 or 3, and even 5 grs.

TINCTURA QUASSIÆ—Tincture of Quassia. Dose.—Dog, 5 ms to 1 dr.

EXTRACTUM QUASSIÆ FLUIDUM—Fluid Extract of Quassia. Dose.—Horse, ½ to 1 oz.; dog, 2 ms. to ½ dr.

Besides its internal use it is used as an infusion for rectal worms; 2 to 4 ozs. to the pint of warm water.

GENTIANA is the most used in veterinary practice; it contains no tannin, or so little that it can be combined with iron, and is an excellent stomachic tonic.

The dose of the extract is the same as quassia.

TINCTURA GENTIANÆ COMPOSITA—Compound Tincture of Gentian. Dose.—Horse, 1 to 4 ozs.; dogs. ¼ to 1 dr.

POWDERED GENTIAN RADIUS (root.) - Dose. - Horse, 2 drs. to 1 oz.; sheep and pigs, ½ to 3 drs.; dogs, 5 to 20 grs.

EXTRACTUM GENTIANÆ FLUIDUM.—Fluid Extract of Gentian. Dose.—Horse, ½ to 2 ozs.; sheep, 2 to 4 drs.; pigs, 1 to 3 drs.; dogs, 15 ms. to 1 dr.

CALUMBA OR COLUMBA.—This is also a good stomachic. We have the tincture of calumba and fluid extract of Calumba—Extractum Calumbæ Fluidum.

Dose of the fluid extract, horse, ½ to 2 ozs.; sheep, 1½ to 6 drs.; pigs, 1 to 4 drs.; dogs, 5 ms. to 1 dr.

Dose of powdered Columba the same.

AROMATIC BITTERS.

SERPENTARIA VIRGINIA—VIRGINIA SNAKE ROOT.—We have an extract of serpentaria and a fluid extract.

EXTRACTUM SERPENTARIÆ FLUIDUM.—Fluid Extract of Serpentaria.—Dose—Horse, 2 drs, to 1 oz.; dogs, 10 to 30 ms.

Actions—tonic, stimulant, expectorant, diuretic and emmenagogue.

PRUNUS VIRGINIANA—WILD CHERRY BARK.—Used a great deal in the human as an expectorant. Contains tannic and gallic acids.

EXTRACTUM PRUNI VIRGINIANÆ FLUIDUM—FLUID EXTRACT OF WILD CHERRY. Dose.—Horse, ½ to 2 ozs.; dogs, 15 ms. to 1 dr.

SYRUPUS PRUNI VIRGINIANÆ.—Doses.—Dogs, ½ to 2 drs.

Actions—tonic, stomachic, astringent, sedative, and reduces expectoration. Uses, catarrhal conditions and nervous coughs.

CASCARILLA, contains cascarillin, tannic acid, volatile oil, etc. Used as a tonic, stimulant and carminative.

Dose of powdered bark.—Horse, 2 drs. to 1 oz.; dog, 10 to 20 grs.; calves, 2 to 6 drs.; pigs, 1 to 3 drs.; lambs, 5 grs. to 1 dr. Good for calves and pigs that are fed on whey and suffer from dyspepsia.

ZINGIBER—Ginger.—Used as a stimulant and carminative in colic; also to promote appetite and aid in digestion, as a local stimulant and rubefacient.

TINCTURA ZINGIBERIS—ESSENCE OF GINGER.—20 per cent strength. Dose.—Horse, ½ to 2 ozs., 1 oz. average dose, cattle double; sheep 1½ drs. to 1 oz.; pigs 1 to 2 drs.; dogs, 15 to 30 ms.

EXTRACTUM ZINGIBERIS FLUIDUM—Fluid Extract of Ginger. Dose.—Horses 2 to 4 drs.; dogs, 2 to 10 ms.

PULVIS ZINGIBERIS—Powdered Ginger.—Dose.—Horse, 2 drs. to 1 oz.; pigs, 15 grs. to 1 dr.; dogs, 5 to 10 grs. Small doses as a stomachic.

CAPSICUM—RED PEPPER—CAYENNE PEPPER.

Extractum Capsici Fluidum – Fluid Extract of Capsicum. Dose.—Horse, 1 dr. to ½ oz.; dog, 2 to 20 ms.

Tincture Capsici.—Dose.—Horse, 2 drs. to 2 ozs.; dogs, 5 to 30 ms. Dose of powdered Capsicum same as of the fluid extract.

There is also an Oleo Resina Capsici.

Physiological Action.—Capsicum is a local irritant, vesicant, hot pungent, acrid in taste, produces a warm sensation in the stomach and body, stimulates the heart and is good in flatulent colic.

Physiological Action of Bitters.—The simple bitters increase appetite and aid digestion, thus promoting constructive metamorphosis. They increase mucous secretion, flow of saliva and gastric juice. They also increase the gastric mucous; their continued use will cause gastric catarrh and interfere with digestion.

The aromatic bitters have similar properties and in addition are carminative. They have a local stimulant action on the alimentary canal, due to the volatile oil, which they all contain; as well as decided astringent qualities, from their tannic and gallic acids.

Therapy, Dyspepsia—Convalescence.—To promote appetite, aid digestion and relieve acute and chronic flatulence, and bronchial catarrh, give prunis virginis, and give quassia internally and by enema for ascarides vermiculares, (or pin worms).

Eucalyptus.—Leaves of eucalyptus globules; Australian or blue gum tree. Tincture eucalyptus is not official.

Extractum Eucalypti Fluidum – Fluid Extract Eucalyptus. Dose.—Horse, ½ to 2 oz.; dog, 15 Ms. to 1 dr.; ⅓ of this dose is sufficient as an expectorant.

Oleum Eucalypti – Oil of Eucalyptus. Dose.—Horse, 1 to 4 drs., dogs, 2 to 10 Ms.; In diluted alcohol, milk or oil.

Composition.—Contains a peculiar resin, of 3 different resinous bodies; a volatile oil consisting of eucalyptol, terpene, and cymol, tannic acid, and a crystallizable fatty acid.

Eucalyptol is most important of all the constituents, and is now official; is a neutral body obtained from the volatile oil of eucalyptus. Dose.—Horse, 1 dr. to 1 oz.; dog, 5 to 30 Ms.

Antagonists and Incompatibles.—Alkalies, mineral acids, salts of iron, mercury, lead, zinc, etc. are chemically incompatible.

All waste producing agents are therapeutically incompatible.

Synergist.—The simple and aromatic bitters including cinchona, hydrastis, etc. Camphor, turpentina, cubebs, copaiba; essential oils and substances containing them are synergistic and promote the action of eucalyptus and can be prescribed with it.

Physiological Action—Eucalyptus has a warm, aromatic bitter and camphoraceous taste. It is sialagogue, stomachic, and carminative, slightly laxative, cardiac stimulant, antiperiodic; (as it passes out of the body, it increases the activity of excreting channels, chiefly the respiratory mucous membrane, and the kidneys); is diaphoretic, diuretic and expectorant; disinfectant and antispasmodic. Miasmatic districts are rendered healthy by the growth of the tree.

Therapy.—As a gargle, inhalation in catarrh of nose, throat or bronchi; used in strangles, influenza, purpura in horses, blood poison of animals, in distemper of dogs, combined with quinine; used externally wherever an antiseptic is indicated. Inject diluted in nasal gleet.

In Tetanus.—Useful internally in chronic stomach troubles, but not in inflamed conditions, chronic catarrh of air passages, especially with excessive secretion. In chronic catarrh of bladder it is highly recommended in human.

Hydrastis. – The parts used in medicine are the rhizoma and roots of Hydrastis Canadensis. (Yellow root or golden seal).

Extractum Hydrastis Fluidum—Fluid extract of Hydrastics. Dose.—Horse, 2 drs. to 1 oz., average dose ½ oz.; dog, 2 Ms. to ½ dr. Dose of powdered Hydrastis the same as the fluid extract.

Fluid Hydrastis is an aqueous preparation, used generally in man—in gonorrhœa.—1 to 4.

There is also a tincture and a glycerite.

Hydrastrininæ Hydrochloras.—Is the hydrochlorate of an artificial alkaloid derived from hydrastine, the alkaloid of hydrastis.

Dose.—Dogs, ½ to 5 grs.; horse, ½ dr. to 5½ ozs.

Composition.—The active principle is hydrastine, which is different from the hydrastin of the eclectics; it also contains berberine.

Antagonists and Incompatibles.—Alkalies, tannic and muri-

atic acids are chemically incompatible. They precipitate berberine from it.

Synergist.—Vegetable tonics in general.

Physiological Action of Hydrastis.—It acts like the simple bitters, promotes appetite and aids digestion, increases nutrition, and stimulates secretion, especially of intestines and liver. It is a stomach tonic, laxative, slightly diuretic and hepatic stimulant. Locally it is an antiseptic and astringent. *In poisonous doses* it acts like strychnine, but less powerful, and requires the same antidote. It is a convulsant and paralyzer. It is also said to promote uterine contractions, and has some power as an antiperiodic. The alkaloid is a motor stimulant.

Therapy.—Useful in conjunctivitis, nasal gleet, leucorrhœa and gonorrhœa; in 10 to 20 ms. of fluid extract to the ounce of distilled aqua. One drachm of the fluid hydrastic to one ounce of distilled water is useful as a gargle for sore throat. Equal parts of fluid extract of ergol and fluid extract of hydrastis is useful in ulceration of the uterus, vagina, and in eversion of rectum. Useful internally during convalescence after debilitating diseases, as influenza and distemper, or wherever a bitter tonic is indicated, as in dyspepsia, chronic gastric catarrh, catarrhal jaundice, constipation from deficient secretions, chronic nephritis and chronic cystitis, fissure of teats, and cracked heels; in full strength also said to be useful in excessive sweating in ½ ounce to 1 drachm doses twice daily.

CINCHONA AND ITS PREPARATIONS.

Cinchona is the bark of a tree, the Cinchona Calisaga, and contains at least 5 per cent of its peculiar alkaloids, of which not less than one-half should be quinine.

Doses of powdered cinchona bark.—Horses, 2 to 4 drs.; cattle, 1 to 2 ounces; sheep and pigs, 1 to 4 drs.; dogs, 10 grs. to 1 dr.

Preparation of Cinchona. CINCHONA FLAVA, (yellow cinchona). This contains the most quinine.

EXTRACTUM CINCHONÆ.—Dose—Horse, 15 grs. to 2 drs.; dogs, ½ to 10 grs.

EXTRACTUM CINCHONÆ FLUIDUM.—Dose—Horse, 2 drs. to 3 ozs.; dogs, 10 ms. to 1 dr.

There is also a tincture and infusion, but the dose is too large for our use.

CINCHONA RUBRA—Red Cinchona.—Preparation, Tinctura Cinchonæ Composita. Dose—Human, 1 to 4 drs.; dogs about the same; dose too large for horses and cattle.

ALKALOIDS OF CINCHONA.

QUININÆ SULPHAS—Sulphate of Quinine.—Occurs in white, silky, light and fine needle shaped crystals, soluble in 740 parts cold water and 30 of boiling water, and 65 parts of alcohol. Very soluble in acidulated water, especially the sulphuric acid greatly increases its solvency; 1 minim of the dilute sulphuric acid for each grain of quinine.

Dose.—Horse, 15 grs. to 2 drs.; colts, 3 grs. to ½ dr.; cattle, ½ dr. to ½ oz.; calves, 20 grs. to 2 drs.; sheep, 20 grs. to 1 dr.; lambs, 1 to 20 grs.; dog, ½ to 5 grs. Don't repeat oftener than every 3 hours.

The bisulphate of quinine is soluble in 10 parts of water. Dose same as the sulphate.

QUININÆ HYDRO BROMAS.—This is bromate of quinine. It does not produce the head symptoms or ringing in the ears that sulphate of quinine does. Dose about the same as sulphate of quinine.

TANNATE OF QUININE.—Used in the human, also in whey fed animals. Dose about the same as sulphate of quinine.

CINCHONINÆ SULPHAS.—Hard, white, lustrous, prismatic crystals, odorless, very bitter taste, soluble at 59 F. in 66 parts water and 10 parts alcohol. Dose about 3 times that of quinine.

Composition.—Cinchona contains 4 principal alkaloids, and some 20 odd isomeric or synthetic alkaloids even 40 are mentioned, besides it contains 2 simple acids, and 2 tannic acids; the most important alkaloid is quinine, which is most abundant in the yellow bark. Red cinchona contains the most tannin. The 4 chief alkaloids are quinine, quinidine, cinchonine, and cinchonidine.

Antagonists and Incompatibles.—Tannic acid, iodine and preparations of iodine, form insoluble compounds with cinchona alkaloids. The alkalies, alkaline carbonates, and alkaline earths precipitate them from solutions. This holds good for all alkaloids. The waste producing agents are also antagonists.

Synergist.—All those agents which promote constructive metamorphosis, as the bitters, iron, arsenic, and mineral acids.

Physiological Actions.—Cinchona is an astringent, bitter tonic. In its astringency only, does it differ from the action of its alkaloids, which are tonic, antiseptic, antiperiodic, antipyretic, antiphlogistic, antimiasmotic, stomachic, and antiferment, also diminishes reflex action. 1 gr. to 1 oz. prevents development of organisms; 2 grs. to 1 oz, prevents putrefaction and decomposition.

The alkaloids are rapidly diffused and slowly excreted, being found in the urine 15 minutes after administration, and for 3 days afterwards. At first they promote appetite, digestion, flow of saliva and gastric juice, but long continued they derange the stomach and bowels.

Action on the Heart.—Small doses stimulate the heart; large doses (2 drs. to 1 oz.) depress it.

On the Brain.—The brain is exhilarated by small doses and depressed by large ones.

On Spinal Cord.—Reflex function of spinal cord is lowered by large doses.

Spleen.—Large doses reduce the size of the spleen; the temperature in fever is lowered, although it does not affect the temperament of a healthy animal. It checks oxidation and lessens protoplasmic and amœboid movement. It is also said to be a uterine stimulant.

On the Body in General.—Small doses stimulate; large doses depress. Tissue change is diminished by it.

How it Reduces Fever.—Probably by virtue of its antiseptic properties; also by increasing the size of red blood corpuscles. It prevents them from giving up their oxygen to a certain extent, and diminishes the number and movement of the white blood corpuscles.

Medicinal Uses.—The bark and its alkaloids are used as bitter stomachics and tonics to improve the appetite and stimulate digestion. Checks abnormal gastro-intestinal fermentation, and is used in atonic indigestion. Quinine sulphate with nitro-muriatic acid dilute.

Weakly foals and calves with relaxed bowels are benefited by quinine sulphate and arom. sulphuric acid.

During convalescence and for debilitating diseases, as a general tonic, the following prescription is useful:

℞
Quininæ sulph., ℥ iii.
Ferri sulphas ex., ℥ i.
Gentian rad., ℥ iii.
Pulv. nucis vom., ℥ iss.
Pot. nit. pulv. ℥ ii.

M. Ft. chart No. 12. Sig.—One powder three times daily.

In Anæmia.—Give quininæ sulphate with tincture ferri chlor. or other iron preparations.

It is serviceable in septicæmia and pyæmia, influenza, strangles, purpura and other febrile diseases, especially of germ origin. In puerperal metritis of cows and ewes; also in distemper of dogs it is of great benefit, and probably the best medicine known in malarial diseases. Give 1 drachm dose every four hours of Quinine sulph. for horses.

Rheumatism—Quinine Sulph. with salol, salicylic acid or salicylate of soda is sometimes injected hypodermically for sciatic rheumatism,

For rheumatism the following is indicated.

℞
Quin. sulph. ℥ i.
Pulv. bellad. fol., ℥ ij.
Sodii. salicylatis, ℥ iij.
Pulv. cimicifugæ, ℥ iij.

M. Ft. chart No, 12. Sig—One powder every four hours.

Chorea.—With other tonics, as cod-liver oil, iron, bitters, nux vomica, strichnine, arsenic, etc.

Quinine is useful in solutions as an antiseptic for wounds, used as a spray or gargle in relaxed or diphtheric throats. Quinine is indicated in tetanus. In colds and catarrhal affections use the following prescription:

℞
Quininæ sulph., ℥ i.
Pulv. Opii, ℥ ij.
Pulv. ammon. carb ℥ ij.
Pulv. camphoræ. ℥ i.

M. Ft. chart No. 12. Sig.—One powder mixed with syrup every 3 hours.

Quinine is used to prevent and allay surgical fever. In erysipelas quinine combined with iron is the best treatment. It is also used in periodic opthalmia, pneumonia, bronchitis, laryngitis, pharyngitis; also used to dress seatons, for atrophy of muscles, etc. In cystitis a 2 per cent solution for irrigation of the bladder.

Prescriptions containing quinine, for catarrhal fever where fever is high.

℞ Quin. sulph, ℥ vj.
Acetanilid, ℥ ij.—℥ iij.
Spts. aeth. nit., ℥ vj.
Spts. vini rectif. ℥ xij.
M. Sig.—℥ iss. every three hours in half pint water.

For fever and debility:

℞ Quin. sulph., ℥ i.
Spts. vini rectif, ℥ xij.
M. Sig.—℥ i every 3 or 4 hours in ℥ v. or ℥ vi. water.

For catarrhal fever.

℞ Quin. sulph. ℥ j.
Acid sulphurici dil., ℥ j.
Aq. qs. ad.. ℥ xij.
M. Sig.—℥ i. every 3 or 4 hours.

Agents Promoting Destructive Metamorphosis or increasing waste, most commonly called waste producers.

Alkalies.—Comprise salts of potash, soda, lithium and ammonia.

Alkalies are directly opposed to acids. They increase acid and diminish alkaline secretions when given ½ hour before meals. In dyspepsia, due to excessive acidity, the result of undue fermentation, administer ½ hour to an hour after eating. The alkalies and salts alter osmosis in animal membranes and promote both the action of the bowels and kidneys; they increase the alkalinity of the blood, encourage oxidation, produce waste, and promote other alterative effects.

POTASSIUM.

Potash and its salts are protoplasmic poisons when used long enough and in sufficient concentration, are more soluble, more readily absorbed and diffused, but are also more quickly excreted than sodium salts, are also more powerful irritants. In large doses they act as irritants to the gastro-intestinal tract.

The circulation is generally depressed by potassium salts; but after small doses, the primary depression of the pulse rate and arterial pressure is followed by a rise of both. Large doses cause a rapid fall of blood pressure and pulse rate, consequently they are cardiac depressants. If injected into a vein they will paralyze the heart.

Antagonists and Incompatibles of all Alkalies.—The alkalies and their carbonates are incompatible with acids and metallic

salts. They decompose the alkaloids of vegetable drugs. Never prescribe with the alkalies any of the alkaloids. Potassium chlorate rubbed with sugar forms an explosive. In case of poisoning by the alkalies give dilute vegetable acids as vinegar, lemon juice, etc. Also administer oils which form soap; demulcents in general are indicated; empty stomach, when you can.

Synergist.—Other alkalies and waste producers as mercury, iodides, etc.

POTASSA—Caustic Potash.—Synonym, Potassæ Hydras.

Characters.—Hard deliquescent corrosive pencils or rods, soluble in water and alcohol.

LIQUOR POTASSÆ.—Solution of potash.

Character.—Colorless alkaline fluid with soapy feel and taste.

Physiological actions of caustic and liquor potassæ.

Externally.—Irritant and caustic, (abstracts water from parts) dissolves fatty matters, antacids, and if well diluted acts as a sedative.

Internally.—Not used to any extent, as milder salts are preferred, is antacid, alterative, febrifuge and diuretic.

Toxicology.—They corrode and inflame the alimentary tract, cause colicky pains, great depression and sometimes perforations.

Post-Mortem.—Will find red and black spots from extravasation of blood; the blood will be dark colored and fluid. Smaller or more dilute doses impair digestion and assimilation, and destroy life by inanition. 2 drs. in 6 oz. of water killed a horse in 32 hours.

Therapy—Caustic potash is sometimes used to destroy warts and fungus growths. A diluted solution is used to cauterize poisoned wounds, but is dangerous, as it may penetrate too deeply and spread. This can be overcome by washing with vinegar.

A 40 per cent sol. of caustic potash is used in the human for in growing toe nails; is painted on, leave on a few minutes until the nail softens, then scrape with glass. It can then be removed with scissors.

℞

Liq. potas.,	℥ ss.
Ac. hydrocyanic,	℥ i.
Aqua,	Oj.

M. Sig.—Use as a wash for itching skin disease to allay ir-

ritation. Two to five drops of Liq. Potash to the ounce is sometimes used in diphtheria to dissolve the false membrane.

Potassii Carbonas.—Carbonate of Potash.

Synergist.—Salts of Tartar.

Actions and Uses.—Same as caustic potash, but less caustic. The potash bicarbonate is preferred for medicinal uses.

Potassii Bicarbonas—Bicarbonate of Potash.—Acid Carbonate.

Character.—Non-corrosive, non-deliquescent, colorless, monoclinic prisms; mildly alkaline taste, solubility, 1 in 4 of water.

Dose.—Horse, 2 to 6 drs.; sheep and pigs, 20 grs. to 1 dr.; cattle, ½ to 1 oz.; dogs. 2 to 30 grs.

Physiological Actions and Uses.—Those of potash, only milder, used to stimulate production of gastric juice; administered before meals with bitter tonics, or after meals to overcome excessive acidity of stomach; used in rheumatism and gouty condition to make blood alkaline and overcome lactic acid. Useful as an antacid in nettle-rash and other itching skin diseases. Internally and externally as a mild wash; ½ oz. to the pint.

The potash bicarbonate is used to remove uric acid deposits, which may occur in overfed dogs. Calculus made up of ammonium, magnesium and phosphates, occur in bladder and urethra of highly fed rams and wethers. For this use potash bicarbonate ½ to 1 dr., well diluted, conjoined with laxative diet and belladonna to dilate urethra; 8 to 16 grains of belladonna is less certain as a diuretic than the acetate or nitrate of potash.

In leucorrhœa use 2 to 4 drs. to 1 pint for injection to overcome acidity.

Potassii Acetas—Acetate of Potash.

Character.—White deliquescent, satiny, neutral masses of peculiar odor; also in a granular form. Soluble in 2½ of water. Alcohol, 1 in 2.

Dose.—Horse, 2 to 4 drs.; for single dose, 1 or 2 ozs.; sheep and pigs, 15 grs to 1 dr.; cattle, 3 to 6 drs., or 1 oz.; dogs, 2 to 20 grs.

Potassii Citras—Citrate of Potash.

Character.—White, granular, deliquescent powder, saline taste, neutral reaction. Soluble, 10 to 6 in water. Dose about the same as the acetate.

Physiological Actions.—Are least irritant to stomach of a

the potash salts. Are neutral and have no action on the gastric juice; are not antacid. They are changed into the carbonate of potash and as such circulate in the blood. Are powerful direct diuretics, stimulate renal cells directly; also diaphoretic; the citrate more than the acetate. They have slight depressing action on the heart; also slightly expectorant.

Therapy.—Used in gouty conditions, Bright's disease, fevers of all kinds, azoturia, (when put in water is not so irritating as the nitrate), dropsical conditions, pleurisy, ascites, œdema of legs, etc. Combined with tonics, iron, etc.

For œdema of legs and other dropsical conditions:

℞ Potas. acet., ℥ vj.
Tr. digitalis, ♏ vj.
Aq. qs. ad., ℥ xij.
M. Sig.—One oz. every 3 or 4 hours.

Potassii Sulphas.—Sulphate of Potash,—Sulphate of soda is preferred.

Dose.—Horse, 2 drs. to 1 oz.; pigs, 15 grs. to 1 dr.; dogs, 3 to 30 grs.; pigs, 15 grs. to 1 dr. Chief action is cholagogue.

Potassii Tartars—Tartrate of Potash.—Small, colorless deliquescent, monoclinic prisms. Soluble 10 in 8 of water.

Dose.—Horse, 2 to 4 drs. as a febrifuge and diuretic; from 6 to 16 oz. as a laxative or purgative, according to size; pigs, ½ to 1 dr.; 1 to 2 ozs. as a purgative; dogs, 2 to 30 grs.; 1 dr. to 1 oz. as a purgative.

Potassii Bitartrate, Acid Tartrate of Potassium—Cream of Tartar.—Soluble 1 in 15 boiling water. Dose—dog, 10 grs. to 2 drs. as refrig rant and diuretic; for purgative from 1 dr. to 1 oz. for dogs. For simple itching skin disease, for dogs equal parts of cream tartar and sulphur.

Physiological Action of the 3 Sulphates.—Tartrate and bitartrate of potassium; hydragogue, saline purgative, abstracts fluid from the blood and pours it into the intestines. In large doses the sulphate is a mild hepatic stimulant slightly increasing the flow of bile. Small doses of the tartrate and bitartrate are diuretics.

Therapy.—Sulphate, for liver disease, the other two for chronic constipation, skin diseases, and as refrigerants in febrile conditions.

Potassii Nitras—Nitrate of Potash.

Synergist—Nitre—Saltpeter.—The purified saltpeter is used in veterinary practice.

Characters.—White, six-sided rhombic prisms, cool saline in taste. Soluble in 1 to 4 of water, neutral reaction.

Physiological Actions.—Large doses irritate the stomach, bowels and kidneys; medicinal doses are alterative, febrifuge, diuretic and feebly laxative. Excreted by the bronchial glands, skin and kidneys, increasing secretions of these organs; is a cardiac depressant, and mild refrigerant and diaphoretic.

Uses.—In certain febrile conditions; in œdema of legs combined with digitalis and general tonics. For the dropsical conditions the acetate and citrate are better.

Externally.—It is a refrigerant and stimulant. Dose—as a febrifuge and mild diuretic, horse, 1 to 4 drs.; dogs, 1 to 10 grs. As a strong diuretic, give a horse 1 oz. but do not repeat oftener than twice in 24 hours. 5 grs. to 1 dr. is a powerful diuretic for a dog.

For acute laminitis 2 to 4 ozs. is given by some veterinarians, this is used principally in the east.

Potassii Chloras.—Chlorate of Potash, Potassium Chlorate.

Character.—Colorless, monoclinic prisms, easily explodes on trituration with sugar, sulphur, tannin, charcoal and glycerin. It is soluble in 1 to 16 parts of cold water and 1 to 2 of boiling water.

Dose.—Horse, 1 to 2 drs.; cattle twice as much, dogs, 1 to 10 grs. Larger doses are occasionally given but this salt is very irritating to stomach and kidneys.

Physiological Actions.—Antiseptic, antacid, alterative, sialagogue, diuretic, febrifuge, and cardiac depressant; irritant to gastro-intestinal tract and kidneys. Externally, antiseptic, mild stimulant and refrigerant. Is a protoplasmic poison, as is the nitrate; disintegrates the red blood corpuscles.

Medicinal Uses.—Laryngitis, pharyngitis, sore mouth from any cause. As a gargle use ½ to 1 ounce to the pint of water. Also used in febrile conditions, especially of a catarrhal nature. Prescription for gargle:

℞ Tr. ferri chlor, ℥ ss.
Pot. chloratis, ℥ i.
Glycerin, ℥ ii.
Aqua qs. ad., Oj.
M. Sig.—1 or 2 ozs. every hour or two.

SODIUM—NATRIUM—SODA, CAUSTIC SODA.

Character.—Grayish white solid masses, or cylindrical pencils.

LIQUOR SODÆ.—Solution of Soda.

Action.—Same as caustic potash and solution of potash, except less poisonous, less irritant and depressing.

SODII CARBONAS.—Soda, or Washing Soda.—Soluble in 1 to 2 of cold water. Dose three or four times that of the exsiccatus.

SODÆ CARBONAS EXSICCATUS—DRIED CARBONATE OF SODA.—A dry, white powder; a purified washing soda. Dose.—Horse, ½ to 2 drs.; pigs, 4 to 10 grs,; dogs, 2 to 5 grs.

SODII BICARBONAS.—BICARBONATE OF SODA.

Character.—White opaque powder, milder than the carbonate. Soluble in 1 to 12 of cold water.

Actions.—Of carbonate and bicarbonate, antacid and alterative.

Dose of Bicarbonate.—Horse, 2 drs. to 1 oz.; dogs, 10 grs. to ½ dr.

Uses.—In digestion, ½ hour before meals, to increase gastric juice, or as an antacid after meals. Young calves when fed on stale skim milk, suffering from dyspepsia, are benefited by 1 or 2 drs. of bicarbonate of soda dissolved in each meal of milk. It is an antidote to poisoning by acids, less irritating than the potassium salts, hence better for dyspepsia. A solution of the carbonate or bicarbonate lessens irritation of itching skin diseases, as urticaria or nettle-rash, 1 oz. to 1 pint of water. Also as injection for leucorrhœa. Never use it in flatulence, as the extra gas due to effervescence is apt to cause rupture of stomach or bowels. The carbonate is used as a remedy against gall-stones, given two hours after meals. It increases the fluidity of the bile.

SODIUM BORATE—SODIIBORAS—Borax.—Colorless crystals wholly soluble in boiling water and in 16 parts of cold water.

Actions.—Antiseptic, parasiticide, mild astringent and alkaline.

Can be used the same as the bicarbonate, internally and externally. Externally boracic acid is better as an antiseptic; also useful as an eye-wash, ½ oz to 1 pint of water.

SODII NITRAS—Nitrate of Sodæ.—Same as potassium nitrate, but not as strong and not used much in medicine.

Sodii Chloridum—Sodium Chloride—Chloride of Sodæ. —Common salt. Soluble 1 in 2¾ water.

Action and Uses.—Salt is an essential article of food; small doses are restorative, tonic, stomachic, antiseptic, antiferment, emetic for dogs, anthelmintic, laxative and alterative; used as injection for pin worms. Its constant use will prevent worms. Animals suffer from inanition without it. Animals deprived of salt do not thrive. As an emetic for dogs 1 to 4 drs. of salt and ½ teaspoonful of mustard in one-half cup of tepid water. Salt as an eye-wash is tonic to the eyes; 1 dr. to 1 pint of water. Condemn rock salt for horses as it contains irritating properties due to its great impurity. Feed animals cooking salt.

Dose.—Horse, ½ to 1 oz.; sheep, 2 to 4 drs.; cattle, 2 to 3 ozs.; dogs, 5 to 20 grs. These doses are stomachic and alterative, often used for cattle as a purgative and vermifuge; from 10 to 20 ozs. in water. In cases of azoturia order plenty of salt; it acts as a diuretic, makes the horse thirsty and causes him to drink water freely and flushes the kidneys.

Sodii Sulphas—Sulphate of Sodæ—Glauber's Salt.

Character. Colorless, transparent prisms, effloresceing on exposure to air. Soluble in 1 to 3 of water; occurs also in granular form, which is the best.

Dose as a purgative, well diluted, horse, 10 to 20 ozs., but generally give the largest dose, 20 ozs.; cattle, 1 to 1½ lbs.; sheep, 2 to 4 ozs.. It is best to give a carminative with it, as ginger or capsicum to prevent griping.

Action.—Purgative, cholagogue, slightly diuretic, febrifuge and hepatic stimulant.

Uses.—Wherever a purgative is indicated, as in congestion of the liver, small, repeated doses act better than large ones; as a hepatic stimulant, dropsical conditions, influenza, especially where liver is involved, tetanus, febrile diseases, where the bowels are apt to be constipated, give 2 to 4 ozs. in a bucket of water. Also used in itching skin disease in full doses.

Sodii Hyposulphis—Hyposulphite of Soda.—Occurs in large colorless, transparent crystals, also in granular forms, soluble in 1 to 1½ of water. Dose.—Horse in gastric flatulence, 4 to 12 ozs.; ½ to 1 oz. for repeated doses; dogs, 5 to 30 grs.

Physiological Actions.—Antiseptic, antiferment, deodorizer and insecticide.

Uses.—Mainly used in gastric flatulence. When you have a case of gastric flatulence, you cannot give anything better than hyposulphite of sodæ. In intestinal flatulence give salicylic acid, or naphthalin. In either case always combine with carminatives. Also prescribe in distemper of dogs, wash for wounds, influenza for horses, strangles, foot and mouth disease, given internally to control suppuration. In the human give 10 gr. doses for gonorrhœa.

CALCIUM, CALX, LIME.

Calcii Carbonas Præcipitatus—Creta Præparata.—Prepared Chalk.—A fine white powder, insoluble in water,.

Dose.—Horses, 2 drs. to 2 ozs.; lambs, 3 to 10 grs.; colts and calves, 10 grs. to 2 drs.; dogs, 2 to 20 grs.; pigs, ½ to 2 drs.

Liquor Calcis—Lime-water. Dose.—Horses, 2 to 16 ozs.; dogs, 1 to 8 drs.

Antagonists, Incompatibles and Synergists.—Same as for potassium and sodium salts.

Actions.—Antacids, intestinal astringents, desiccants.

Uses.—Its principal use is in diarrhœa, combined with opii and tannic acid, also antiseptic; makes a nice dusting powder over abraided surfaces. Antidote to poisoning by carbolic acid, mineral acids, oxalic acid and zinc chloride.

Lime-water.—Milk and Aq. Calcis, equal parts and sweetened is good for puppies raised on bottle, as it is easily digested.

Aq. Calcis and Oleum Lini equal parts is good for burns.

LITHIUM.

Lithii Citras—Citrate of Lithium.—White crystalline powder; soluble in 2½ parts boiling water and 55 parts cold water.

Dose.—Horse, 1 to 4 drs.; dogs, 1 to 20 grs.

There is also a bromide carbonate, salicylate and a benzoate; doses and action about the same, citrate usually being preferred on account of its solubility.

Physiological Actions.—Closely resembles that of potash salts, powerful solvent of uric acid and uric acid calculi, is diu-

retic and renders the urine alkaline; depressant in large doses, but not as powerful as potassium salts.

Uses. – Rheumatism and gouty conditions in general, used in azoturia, but do not recommend its use in this disease, as it seems to render the poison more soluble, so that it is readily taken up by the system, often causing sudden death of a patient that might have otherwise recovered.

AMMONIUM.

Aq. Ammonlæ Fortior—Stronger water of ammoniæ; 28 per cent by weight of the gas dissolved in water.

Character—Colorless pungent liquid, very alkaline.

Dose.—horse, 1 to 2 drs.; sheep and pigs, ½ to 1 dr.; cattle, 2 to 4 drs.; dogs, 2 to 10 ms. Should be well diluted, 1 drachm to 1 pint of water.

Spiritus Ammonlæ.—Contains 10 per cent of the gas by weight, dissolved in alcohol.

Dose.—Horse, 1 to 4 drs., 1 oz. as a stimulant; dogs, 1 to 20 ms.; sheep and pigs, ½ to 1½ drs.

Aqua Ammonia.—10 per cent, of the gas dissolved in water. Dose twice that of the Fortior.

Spiritus Ammonlæ Aromaticus.—Aromatic spirits of Ammoniæ.

Synonym.—Sal. Volatile, composed of ammon. carb., aq. ammon., oil of pimenta, oil of lemon and oil of lavender in a menstruum of alcohol and water.

Dose. – Horses, ½ to 1½ oz.; cattle, 1 to 2 ozs.; calves, ½ to 2 drs.; sheep and pigs, 1 to 2 drs., lambs, 5 to 30 ms.; dogs, 5 to 90 ms.

Physiological Actions.—The four preparations of ammonia are gastric and general stimulants; stimulates the cardiac, respiratory and spinal systems. The aromatic spirit is also carminative. They irritate the nose when inhaled, but reflexly, they stimulate the pulse and respiration, are good stimulants as they do not affect the brain. Externally they are rubefacients, and when confined are vesicants.

Uses.—Externally as counter-irritants; it is frequently used in liniments, 1 ounce of aqua ammon. to 1 pint of water, etc.,

makes a good stimulating liniment. As a counter-irritant in chest diseases, etc.:

℞ Ol. sinapis, ℥ i.
Aq. ammon. fort, ℥ i.
Ol. gossyp. sem., ℥ iv.
M. Sig.—Apply.

It is also used as an inhalation for syncope or anæsthesia.

Internally.—May be used as diffusible stimulants in collapse from any cause. In indigestion, especially flatulence and spasmodic colic use the aromatic spirits. It is an antidote to poisoning by narcotic and sedative drugs, such as opium, digitalis, aconite, etc. The aqua ammon. or aqua ammoniæ fort. are injected into the jugular vein for parturient apoplexy in cattle, 1 dr. to ½ oz. of distilled water. The same is used for snake bites, given internally and injected into the wound and surrounding subcutaneous tissues, also for poisoning by gases.

Representative prescription for intestinal flatulence or spasmodic colic:

℞ Fl. Ex. cannabis Ind., ℥ ss.
Fl. ext. hyoscyami, ℥ ii.
Tr. zingib, ℥ iss.
Spts. ammon. arom., ℥ iss.
Ac. Salicylici, ℥ iii.
M. Sig—At one dose in one pint of water; repeat in one-half or three-quarters of an hour, if necessary.

Liquor Ammonii Acetatis.—Solution of acetate of ammonia.

Synonym.—Mindererus spirits. The carbonate of ammonia is gradually added to dilute acetic acid until neutralized; each ounce will contain about 23 grains of carbonate of ammonia; should always be made up fresh.

Dose.—Horse, 2 to 6 ozs.; dogs, 1 to 4 drs.; cattle, 3 to 8 ozs. Dilute in from 2 to 4 parts water.

Physiological Actions.—Diaphoretic, antipyretic, mild stimulant, mild diuretic, mild expectorant and stomachic.

Uses.—Much used in febrile and inflammatory attacks, especially of the respiratory organs, catarrh, bronchitis, pneumonia, influenza, strangles, etc., combined with other remedies, improves the appetite; can be used externally as a refrigerant over swollen and inflamed tendons, used as a general stimulant.

Ammonii Carbonas.—White, translucent masses, pungent ammoniacal odor, alkaline, soluble 1 in 4 of water.

Dose.—Horse, 1 to 3 drs. when repeated every 3 hours, 1 dr. is enough. Cattle, 1½ to 5 drs.; dogs, 1 to 8 grs.; sheep and pigs, 15 to 40 grs.; colts, 20 to 60 grs. well diluted. The larger doses are used as stimulants.

Physiological Actions.—Gastric stimulant, general stimulant, cardiac stimulant, stimulant expectorant, antacid, carminative, respiratory stimulant and emetic in dogs.

Uses.—Can be used in indigestion as indicated, but the milder alkalies are preferred, also in exhaustion, and debilitating diseases. In diseases of the air passages it is used as an expectorant; is contra-indicated in purpura hæmorrhagica, as it lowers the oxygen-carrying power of red blood corpuscles, and dissolves fibrin. As a stimulant it can be combined with alcohol and sulphuric ether. Ammonia is indicated where a clot, thrombi or embolism, is supposed to exist, on account of its defibrinating power.

Ammonii Chloridi.—Chloride or muriate of ammonia.

Synonym.—Sal. ammoniac.

Character.—Translucent, fibrous masses or colorless crystals, volatile, and soluble 1 in 4 of water.

Dose.—Horse, 1 to 4 drs.; cattle, 2 to 6 drs.; sheep, 1 to 2 drs.; colts, 20 to 60 grs.; calves, ½ to 2 drs.; dogs, 1 to 10 or 15 grs.

Physiological Actions.—Expectorant, hepatic stimulant, mild diaphoretic, diuretic, antacid and mild general stimulant. The chief difference between the carbonate and the chloride of ammonia is that the chloride is more of an expectorant, and the dose larger than that of the carbonate but the carbonate is more stimulating.

Uses of the Muriate or Chloride.—Used in all diseases where an expectorant is indicated, catarrhal conditions, pneumonia, influenza, chronic congestion of the liver, etc. Give 2 ozs. each of the chloride of ammonia and pot. nit. in 1½ pints of water as a refrigerant for inflamed swellings, sprained tendons, joints, etc.

For Catarrhal disorders give:

℞ Quininæ sulph. ℥ vi. to ℥ i.
Ammon. chloridi pulv. ℥ iii.
Camph. pulv. ℥ i.
Pot. nit. pulv. ℥ iii.

M. Ft. Chart No. 12. Sig.—1 powder every 3 hours.

Ammonii Benzoas—Benzoate of Ammonia.

Dose for horse, 2 drs. to 1 oz.; dogs, 2 to 30 grs.

Use in gouty conditions, and to dissolve gravel, same as benzoic acid in alkaline urine; also as an expectorant, and in cystitis has a soothing effect on the mucous membrane.

Ammonii Phosphas.—Phosphate of ammonia, is used for gout and to dissolve uric acid calculi. Dose for dogs, 2 to 20 grs.

There is also a Valerianate of Ammonia. All the preparations of ammonia are more or less stimulating to the entire motor apparatus, but in excessive doses cause death by paralysis; if too long continued or given in too large doses may cause irritation and inflammation of the gastro-intestinal tract. Dilute well.

VEGETABLE ACIDS.

Acidum Tartaricum.—Occurs in colorless crystals. Obtained from cream of tartar. Refrigerant and purgative. Dose for dog, 5 to 40 grs.

Acidum Citricum—Citric Acid.—Obtained from lime fruit and lemon. Colorless crystals. Dose for dog, 2 to 20 grs.

Acidum Aceticum—Acetic Acid.—A colorless liquid of pungent, sharp odor, is the sour principle of vinegar.

Acidum Aceticum Dilutum—Dilute Acetic Acid—Vinegar.—Contains 17 per cent strength of acetic acid and 30 per cent of water. Dose of dilute acetic acid, horse, 1 to 2 ozs.; dogs, 15 ms. to 2 drs.

Acidum Aceticum Glaciale.—Pure acetic acid.

Actions.—Concentrated these acids are escharotic; dilute, they diminish thirst and allay restlessness, are refrigerants, increase acidity of urine, promote secretion and increase the water of the urine. Long continued doses cause general wasting away. They are antilithic.

Uses.—The glacial or full strength acid is used to remove warts or other growths. The dilute acetic acid as a wash in itching skin disease, and externally as a refrigerant. The citric and tartaric are not much used in veterinary practice. A little lump of citric acid about the size of a pea left to dissolve in the mouth will cure hoarseness in the human. Tartaric acid is said to eliminate phosphates from the urine.

SULPHUR, SULPHITES AND SULPHIDES.

Sulphur Sublimatum.—Sublimed sulphur, commonly known as flower of sulphur, is the chief form used in veterinary practice. Dose as an alterative and laxative.

Horses, 1 to 4 ozs.; sheep and pigs, ½ to 1 oz.; cattle, 3 to 6 ozs.; dogs, ½ dr. to ½ oz.

There is also a *Sulphur Præcipitatum*, known as the milk of sulphur; also *Sulphur Lotum*, known as washed sulphur. As an alterative about one-half the above doses are enough. In human practice sulphur is used in rheumatism applied to parts on flannel. They are all insoluble in water or alcohol.

Physiological Actions.—Internally, laxative and alterative.

Externally.—Chiefly used as a parasiticide and desiccant, also to disinfect premises.

Uses.—Burned, and used as a deodorizer and disinfectant; as a mild laxative where powerful ones would irritate and be dangerous; as in pregnancy, convalescence from acute diseases and piles. Good for young animals as a laxative; in urticaria (nettle-rash). The following prescription may be used:

℞ Sulphur sub., ℥ vi.
Carbo ligni., ℥ iii.
M. Sig.—Two tablepoonfuls 3 times daily in feed.

Used in parasitic and other skin diseases, mange, etc.

For mange clip off the hair, scrub well, give Fowler's solution internally, if chronic, and use sulphur and lard externally. In more obstinate cases of mange use the following:

℞ Sulphur sub. ℥ i.
Ol. cadinum, iii.
Adeps., ℥ v.

Thoroughly rub in and leave on for 48 hours. Wash off and repeat, or

℞ Sulphur. ℥ ii.
Pot. carbonate, ℥ i.
Lard or oil, ℥ x. or xii.

Dissolve with aid of gentle heat, then add 2 ozs. of benzine when cold. Use the same way as above.

Calcium Sulphide.—Soluble 1 to 500.

Dose.—Horse, 10 to 20 grs., every three hours to stop suppuration. A sulphite of calcium may be administered for the same purpose, ½ to 1 dr. three times daily in tetanus.

Acidum Sulphurosum—Sulphurous Acid. Colorless liquid, odor of burning sulphur; and a sulphurous sour, and somewhat astringent taste:

Dose.—Horse, 2 drs. to 1 oz.; dogs, 1 to 60 ms. every three

or four hours, diluted. Not much used internally; used more externally. It combines with oxygen and forms sulphuric acid. For local use dilute with 3 or 4 times its quantity of water.

Actions.—Disinfectant, deodorant, antiseptic and parasiticide; is irritating, should be well diluted.

Uses.—Sulphurous gas from burning sulphur, is used for husk or hoose of sheep and calves; this is a disease in which worms affect the bronchial tubes, due to strongylus micrurus in calves, and strongylus filaria in sheep. The subjects are placed in a loose box and sulphur burned about 6 feet away from them, so that air may dilute the fumes before being inhaled by the animals; let them inhale the fumes for 10, 15 or 20 minutes or longer, unless irritation is too great.

The sulphurous acid is used in foot and mouth diseases, as a spray or on lint; in diphtheria and in epizootic aphthæ, etc., as a spray; used internally in septicæmia.

Antagonists and Incompatibles of Sulphur, Sulphides and Sulphites.—The mineral acids, including sulphuric, decompose the sulphites and hyposulphites. All oxidizing agents are incompatible, as these preparations have a great affinity for oxygen and the sulphites readily become sulphates. Solutions of the metals are incompatible with sulphides of potash and calcium.

Antidotes.—Are chlorine water, common salt, sulphate of iron, etc.

Synergist.—All agents which arrest fermentative processes or promote waste. The alkalies favor their action, both chemically and physiologically.

IODINE AND ITS PREPARATIONS.

Iodum-Iodine.—Occurs in bluish black crystalline scales of a metallic lustre, slightly soluble in water, 1 in 5000, alcohol, 1 in 10, ether, 1 in 4, and in a solution of iodide of potash and a solution of chloride of sodium, is very soluble. It is non-metallic. It is obtained from the ashes of sea-weeds and should be kept in glass stoppered bottles in a cool place. We use the Resublimed Iodine. Dose of the resublimed is for horse, 15 grs. to 1 dr.; cattle, ½ to 1½ drs.; sheep, 10 to 30 grs.; pigs, 5 to 20 grs.; dogs, ¼ to 1 gr.

Liquor Iodi Compositus.—Compound solution of iodine, iodine 5 parts, potassium iodide 10 parts, distilled water qs. to

make 100 parts. It is always well to make your own solutions of any strength you desire.

Ammonium Iodidum—Ammonium Iodide - Iodide of Ammonia.—White granular, very deliquescent salt, becoming yellowish brown by exposure, very soluble in water and alcohol.

Dose.—Horse, 1 to 4 drs. average dose 2 drs.; dogs, 1 to 10 grs. Very good in pneumonia where resolution is tardy.

Sodii Iodidum—Sodium Iodide—Iodide of Soda.—Minute crystals or crystalline powder, deliquescent, having a saline and bitter taste, and alkaline reaction. Soluble in water and in alcohol; actions and dose about the same as Iod. of Pot.

Potassium Iodidum—Potassium Iodide—Iodide of Potash.—Occurs in white or transparent crystals, wholly soluble in water; alcohol 1 in 18, glycerin 1 in 3.

Dose.—Human, 5 grs. to 1 dr.; horse, 2 to 4 drs. 1 oz. can be given. Cattle, 3 to 6 drs.; sheep, 10 to 30 grs.; pigs, 15 to 30 grs.; dogs, 1 to 10 grs.

These are for doses that are to be repeated two or three times a day, but can be increased in certain cases, as in blood poisoning; usually given in solution. On account of the expense of pot. iod. can give resublimed iodine and pot. iod. together.

Preparations of Iodine.—For External Use.

Iodoforum—Iodoform.—Yellow crystals or amorphous powder, very disagreeable odor, insoluble in water, but soluble in ether and the fixed and volatile oils. Olive-oil is usually used as a solvent.

Iodoform contains by weight 96.69 per cent iodine. Sometimes administered internally.

Dose in human, 1 to 5 grs.; dogs about the same.

Allied Drugs to Iodoform.

Aristol.—Contains 45.8 per cent iodine, and has not much odor.

Antiseptol.—Has 50 per cent iodine.

Iodol.—Contains 88.97 per cent iodine and is free from odor. Iodol is preferred in dog practice as a substitute for Iodoform in chronic sores and ulcers.

Tinctura Iodi—Tincture of Iodine.—Composed of iodine 70 parts, alcohol 1000 parts, strength about 7 per cent, increased to 8 per cent by evaporation.

Unguentum Iodi—Iodine Ointment.—Composed of iodine four parts, iod. of pot. 1 part, water two parts and benzoated lard 93 parts; strength 4 per cent.

There is also an ointment of pot. iod., but is too mild for veterinary use.

Antagonists and Incompatibles.—Iodine is incompatible with nearly everything, the mineral acids, metallic salts, the alkaloids, etc. The chemical antidote is starch, which forms almost an inert compound. Bicarbonate of soda 2 to 4-oz. doses twice daily seems to stop iodism. Starch should be given freely diffused in water; when possible evacuate the stomach for horses, emetic for dog, followed with a purgative if the animal is not too much debilitated. Do not give iodine near a meal, as its action is impaired; administer on an empty stomach.

Synergist.—Alkalies and other remedies which increase waste favor the action of iodine and iodides; under some conditions mercurials are especially synergistic.

Physiological Actions.—Externally, stains the skin yellow, is stimulant, irritant and vesicant if used concentrated, antiseptic, (1 in 7000 destroys bacilli and spores) also resolvent, parasiticide, deodorizer and disinfectant, but is too expensive for this purpose. Tincture of iodine is sometimes used in the human and the smaller animals, as a counter-irritant. Iodine acts notably on the skin, mucous membranes and lymphatic glands, strong solutions cause irritation and desquamation of the cuticle, and on that account stimulates the growth of hair.

Internally.—Alterative, resolvent, deobstruent and expectorant. Large doses of iodine or its compounds are general depressants. Medicinal doses stimulate glandular activity and promote tissue change, as well as the absorption and elimination of recent formed tissue and diseased cells. They hasten the removal of lead, mercury, and other metals from the system by combining with them. It is eliminated by the mucous surfaces and glands, particularly in the saliva, perspiration and urine, consequently full doses may irritate these channels of elimination.

Toxicology.—The chain of poisonous symptoms are called *iodism*, and is produced by continued full doses of iodine or its salts, or where an idiosyncrasy exists. Iodism is characterized by great prostration, loss of appetite, won't drink water, an irritable catarrhal condition of the mucous membrane of the nos-

trils, eyes, throat and bronchial tubes, and a profuse discharge of saliva from the mouth, a thick yellow or brownish discharge from the nostrils, with irritation of the digestive organs, vomiting in dogs, with attempts at it in the horse; sometimes a vesicular skin eruption occurs, diminished secretion of urine, sometimes totally suppressed, great languor, inaptitude for exertion, elevation of temperature, irregular pulse and very rapid emaciation. The discharges from the bowels are apt to be bloody, more particularly in dogs.

Antidotes.—Starch is the chemical antidote, bicarbonate of soda in 2 or 3 oz. doses twice daily is also very beneficial. Give stimulants, and combat the following irritation and symptoms as they arise.

Therapy.—Iodine or its compounds are used as alteratives in blood disorders, especially due to a plethoric condition, and in grease heels, cracked heels and nettle-rash. It is used for glandular enlargements of all kinds, such as the parotid, or sub-maxillary glands, liver, udder, etc., also in chronic rheumatism, dropsical conditions, as œdema of legs, hydrothorax, and ascites combined with tonics; persistent or chronic skin disease, in catarrhal diseases it is inhaled as a vapor. Use the tincture of iodine 1 or 2 oz. in 1 pint of water or vinegar, pour on a hot iron or brick, put into a bucket with dampened hay, inclose in a bag and hold over the horse's nose, also useful in the same way for dry congested conditions, of the respiratory mucous membrane as in bronchitis. The iod. of pot. is used in chronic cough, heaves and thick-wind. The iod. of ammonia is very useful in pneumonia, where resolution is tardy; for this use alternately with Fowler's solution, give Fowler's solution 3 times a day and ammon. iod. every 4 hours. Iodine is almost a specific for diabetes insipidus, or polyuria; for this purpose use the resublimed iodine ½ to 1 dr. combined with Ferri Sulphas 1 to 2 dr. with a stomachic, such as gentian twice daily. Usually from 3 to 6 doses will cure, then follow up with general tonic treatment. It is also used internally for large swellings, such as remain from lymphangitis; used internally in chronic eye diseases. The Pot. Iod. is used in actinomycosis (lumpy jaw); used as an alterative and resolvent for empyema, hydrocele, laminitis sub-acute or chronic, in goitre, (that is enlargement of the thyroid glands). Iod. of Pot, internally and tincture of iodine externally. Pot. Iod. is

used in enlargements of the joints or thickening of the skin.

In mercurial and other metallic poisoning, iodine is administered, to combine with these metals and promote their elimination; it is also administered in chronic Bright's disease, enlargement of the prostrate or Cowper's glands, (which will cause difficult urination).

The following prescription makes a nice method of administering Iodine to horses, or other animals. Watery solutions are not as irritating as alcoholic solutions.

For 1000 or 1200-lb. horse:

℞ Iod. resub., ℥ iij.
Potas. iod., ℥ jss.
Aq., ℥ xij.

M. Ft. Sol. Sig. One ounce three times daily in 4 to 6 ozs. of water on an empty stomach.

External Uses.—In the iodine ointment the tincture of iodine is used for this purpose. The tincture of iodine is painted on or the ointment rubbed in, for glandular enlargements, small swellings, knee knocking or interfering, small splints in the early stages, capped hock and curbs; used as a mild stimulant and resolvent for chronic synovitis, bursal enlargements, and thickening of the periosteum. This thickeniug of periosteum may occur from any cause, as sore shins, etc. The tincture can be used as a counter-irritant for sore throat or lungs, in consolidation if circumscribed in dogs; used to stimulate the growth of hair and prevent scars, as where a horse falls and skins the knee, Dr. Quitman recommends healing them very slowly under a salve instead of powder, and as quickly as new tissue forms paint the parts with tincture of iodine, or after a blister, paint the bald spots, and this will stimulate the hair bulbs. Used to stimulate slow healing sores or ulcers. The tincture should be painted around the edges. The tincture is also injected into cysts and abscesses, as shoe boils, capped hock, thoroughpin and other bursal enlargements, it promotes adhesion of the walls. For so called, cold abscesses on horses' shoulders, which spring up very quickly, in which you find a small pus pocket, take a long scalpel and open to the pocket, after opening inject tincture of iodine into it once or twice daily; afterward plug up the opening with oakum, also blister the surface. The same treatment is used in shoe boils, capped hock, etc. The iodine acts by setting up an inflammatory process and stimulates healthy granulation. Can be used in per-

sistent cases of mange or other forms of eczema and psoriasis or ring worms; for these diseases the tincture or an aqueous solution can be used if it is localized. For large surfaces as in mange, Dr. Quitman recommends the following:

Iodine 2 parts, pot. iod. 1 part, tar-oil 4 parts, to 32 parts of lard; this can be safely applied over a large surface. Used in dropsical conditions as ascites in dogs, the fluid is aspirated out of the abdominal cavity and then use resublimed iodine .1 dr. pot. iod. 1 dr. to 1 pint of hot water and injected into the abdominal cavity, then aspirate out and give pot. iod. internally, alternated with iron and other tonics. The same treatment can be used for horses with hydrothorax.

Iodoform. — Is used externally for sores and ulcers, but has a very disagreeable odor. Iodoform ½ to 1 dr. dissolved in olive oil ½ oz. may be injected into abscesses, boils, etc.

Iodol.—Is a good substitute for iodoform and is free from odor. Iodine should always be administered on an empty stomach. For internal use, the aqueous solutions are best.

MERCURY AND ITS PREPARATIONS.

Most important one is mercury, quicksilver not used in veterinary practice.

Unguentum Hydrargri.—Blue ointment, mercurial ointment, contains 45 per cent of mercury.

Actions and Uses. — Applied with friction, irritates the skin, and is readily absorbed, may even vesicate; in small animals may cause constitutional symptoms. Used in psoriasis and other persistent scaly skin diseases, but use mildly; also to stimulate indolent ulcers. Used to kill mange and similar parasites, as ringworms, but is dangerous; it is used as an absorbent to reduce swellings of any character and small exostosis. Can be used externally about the same as iodine.

Summary.—Parasiticide, stimulant and resolvent.

Unguentum Hydrargyri Nitratis. — Ointment of nitrate of mercury, citrine ointment, of a lemon yellow color, composed of mercury 7 parts, nitric acid 17 parts, lard oil 76 parts.

Actions and Uses. — Irritant caustic, or resolvent, is used full strength, to destroy small growths, foot-rot in sheep, canker in horses feet, also used in skin diseases diluted 1 to 3 parts of oil; it is a parasiticide, kills lice, ring worms, and is very readily

absorbed. Diluted is used locally for chronic eye diseases; where you have an opacity of cornea or deposits in the eye, use:

℞ Ungt. hydrarg. nitratis, ʒ i.
Lanolin a. a., ʒ ij. to ʒ iij.

With eserine or atropine as indicated. Apply around the orbit and on the lids of the eye, if very painful combine a little cocaine.

Oleatum Hydrargyri.—Oleate of mercury, composed of yellow oxide of mercury 10 parts, oleic acid 90 parts; this is one of the most readily absorbed of the mercurial preparations.

Action and Uses.—Is somewhat irritating, very penetrative and diffusible; it promotes absorption, on account of its being so readily absorbed into the tissues. Morphia or other alkaloids are mixed with it, for pain; small exostosis as splints can be removed with the oleate of mercury. Used in inflammation of the joints; combine 1 to 3 grs. of morphia to the 1 dr. for deep seated lameness, used also in subacute or chronic arthritis, exostosis of any kind if small, and for induration of the udder, and other purposes similiar to mercurial ointment to promote absorption. When to be repeated, should be diluted with oil, lard or lanolin equal parts.

Hydrargyrum Cum Creta.—Mercury with chalk, known as gray powder.

Physiological Actions.—Alterative, chiefly used for its antacid and laxative effects, in small and delicate animals; such as dogs, young calves and foals, suffering from bilious indigestion and gastric irritation; alterative for dogs.

Dose.—Young foals and calves, 5 to 15 grs.; dogs, 1 to 3 grs. once, twice or 3 times daily. Pigs, 5 to 20 grs.

Massa Hydrargyri.—Synonym, blue mass, blue pill, 33 per cent mercury, or 3 grs. contain 1 gr. metallic mercury.

Dose.—Human, ½ to 15 grs.; dogs, same, not used for larger animals.

Actions.—Cholagogue, laxative, deobstruent and alterative.

Hydrargyrium Iodidum—Rubrum—Red Iodine of Mercury.—A bright scarlet red powder, feebly soluble in water, but easily in a solution of iod. of pot. Do not mistake it for red oxide, which is milder and paler in color.

Actions.—Irritant, not often used internally, resolvent and pustulant, used as a blister 1 to 6, 8 or 10 of lard, used to reduce

exostosis, of all kinds, splints, spavins, ring bones, etc., penetrates deeply, also used to reduce soft swellings, to arrest chronic inflammation, and promote absorption of inflammatory deposits, as seen in sprained tendons, enlarged bursæ, enlarged joints, etc. Is used as a blister or counter-irritant in sore throat, chronic cough and roaring; used on rheumatic joints. It can be mixed with cantharides as you do not have to use so much mercury; if used too strong it destroys the hair bulbs.

Prescription for blister:

℞ Pulv. canth. hydrag. iod. rubr., aa., ʒ ij.
Adeps, ʒ iij.
Sig.—Rub in for 5 to 10 minutes.

Hydrargyrum Chloridum Mite; Hydrargyrum Sub-Chloridum; Hydrargyrum Sub-Muriate; Calomel.—Mild chloride of mercury; in writing a prescription for calomel, Hydrarg. Chlor. Mitis underlining the Mite thus, to avoid errors.

Character.—A dull heavy insoluble, nearly tasteless powder.

Dose.—Average dose for horse ½ to 2 drs.; cattle, 1 to 2 drs.; sheeep and pigs, 5 to 30 grs.; dogs, ¼ to 10 grs. Where calomel is used as an alterative, small repeated doses are combined with opii to prevent its too rapid removal from the bowels. As a purgative is usually combined with bicarbonate of soda.

Actions.—Laxative in small repeated doses; cathartic in large doses; full doses irritate the stomach and cause emesis (vomiting) in man and dogs. Calomel is a diuretic, seems to stimulate the urea functions of the liver; does not directly increase secretion of bile, but removes it from the duodenum, and in this way reflexly increases its secretion by the liver. Repeated doses may cause mercurialism. Alterative when combined with opii, laxative in small repeated doses, cathartic in large doses.

Summary.—Diuretic, alterative, laxative, cathartic and vermifuge.

Externally.—Calomel is a desiccant, stimulant, antiparasitic and antiseptic.

Uses.—Gastric irritation, influenza, where there is a yellowness of the mucous membrane, liver disorder. It is useful as an adjunct to aloes or other purgative. As a laxative or purgative for horses, give aloes and calomel; cattle, calomel, epsom or Glamber's salts; dogs, calomel with resin of jalop. Do not keep the administration of calomel up too long, as it may cause mer-

curialism. Pure calomel is the best drug known for thrush. For moist skin diseases and sores with a raw condition, calomel 1½ oz. and bismuth subnitrate 1½ ozs. is used where you wish to dry them up quickly and relieve itching. As a purgative for dogs use equal parts of calomel and bicarbonate of soda.

HYDRARGYRUM CHLORIDUM CORROSIVUM—HYDRARGYRUM BICHLORIDUM—HYDRARGYRUM PERCHLORIDUM—CORROSIVE CHLORIDE—CORROSIVE SUBLIMATE.

Character.—Heavy, colorless masses; soluble 1 in 16 of water, 1 in 3 of alcohol; hydrochloric acid or muriate of ammonia increases its solubility.

Dose.—Horse, 1 to 5 grs.; sheep, ½ to 1 gr.; dogs, 1-60 to 2-10 gr.; cattle, 2 to 8 grs.; pigs, ⅛ to ½ gr. Not very often given internally, except in human for syphilis, combined with pot. iod.

Action.—Corrosive, irritant poison, occasionally used as an alterative, antiseptic and hepatic stimulant. Repeated doses or long continued cause mercurialism.

Externally.—A most powerful antiseptic, astringent, caustic and parasiticide.

Uses.—Internally, milder preparations of mercury are preferred; has been used in tetanus, but its chief use is that of an antiseptic externally; used usually in the strength of 1 to 500, 1 to 1000 or 1 to 2000; for uterus 1 to 5000 or 1 to 10000. 7½ grs. to a pint make a, 1 to 1000 solution. 7½ grs. to a quart make a 1 to 2000 solution. 15 grs. to a pint make a 1 to 500 solution. Best antiseptic for nail wounds, thrush, quittor, fistulous withers, etc., especially foul wounds, 1 to 1000 solution kills ring worms, lice, etc., if used over a large surface must be used milder. For pruritus, prurigo and urticaria. Prof. Robertson recommends:

℞

Hydrarg. chlor. corros.,	grs. xii.
Ac. hydrocyan. dil.,	℥ ss.
Glycerini,	℥ ii.
Aqua,	℥ x.

Bathe the parts several times a day; in diphtheria a spray of ½ gr. to the 1 oz. of water is sometimes used; used for disinfecting purposes, mixed in white wash for barns, after glanders; used as a sloughing agent in quittor, fistulous withers, poll-evil, fibrous

tumors, etc. Dr. Quitman recommends it as one of the best agents for quittors as follows:

℞ Hydrarg, bichlor., ℥ i.
Spts. vini rectificati, ℥ iii.
M. Ft. Sol. Sig.—Inject once or twice daily.

For fibrous tumors 1 oz. of corrosive sub. rolled in tissue paper and inserted into the tumor will slough it out without danger. The mercurials promote waste by stimulating the lymphatics.

Mercurialism, Salivation or Ptyalism.—Symptoms sore teeth, spongy gums, profuse saliva and tears, fetid breath, bluish line along margins of the teeth, then swelling of the glands, aching jaws and muscles, fever with rapid emaciation, anæmia, hair falls out, ulcers form on skin, fetid diarrhœa, trembling, nervous, abortion in pregnant animals. Large doses of the irritating preparations cause gastro-enteritis.

Antidotes.—Best is albumen, the white of one egg to 4 grs. of corrosive sublimate, emesis for dogs, stomach pump for horse; cathartic; wheat flour, milk, etc.

Incompatibles.—Incompatible with nearly everything; calomel with hydrochloric acid or chloride of soda or other chlorides form corrosive sublimate; corrosive sublimate and pot. iod. form red iod. of mercury, etc. Best to prescribe them alone.

ARGENTUM—SILVER.

There is an oxide, cynide and iodide, but the nitrate is most important.

Argenti Nitras—Nitrate of Silver.—A heavy colorless salt wholly soluble in water; always use distilled water in making a solution, and protect the bottle from light and heat.

Dose.—Horses and cattle, 5 to 10 grs.; sheep, 1 to 2 grs.; pigs, ¼ to 1 gr.; dogs, 1-30 to 1 gr. average dose for dog ¼ or 1-5 of a gr.

Argenti Nitras Fusus—Fused Nitrate of Silver—Lunar Caustic.—Used only for topical applications, occurs in little sticks about ½ the size of a lead-pencil.

Antagonists and Incompatibles.—All chlorides form insoluble chlorides of silver, mineral acids, alkalies and their carbonates, other astringents and lime-water; in case of poisoning by any of

the silver preparations use common salt to form the insoluble chloride of silver.

Synergist.—All waste producers, as mercury, iodides, etc. favor its actions.

Physiological Actions.—Silver nitrate combines with the albumen of the tissues, and is a limited caustic; causes superficial inflammation and stains the parts black; small doses increase secretion, stimulate the heart. It promotes nutrition, and is said to be a nerve tonic. Its continued administration causes general waste, gastro-intestinal catarrh, fluidity of blood, slate colored lines about the gums, and similar discoloration of skin and mucous membrane, followed by nervous disorder, paralysis, convulsions and death.

Uses.—A solution of 40 grains to 1 ounce of nitrous ether is said to abort superficial inflammation, if early applied; used for erysipelas, 20 grains to 1 ounce of distilled water, applied around margin to limit the area; also used in ulceration of the throat; used with a spray or swab, in strength of from 10 grs. to 1 dr. to 1 oz. of water.

For dysentery, internally and as an enema it is very good; used in conjunctivitis 1 to 5 grs. to 1 oz., 2 grs. to 1 oz., is the average strength, and should only be applied to the conjunctivæ or lids, and should not be used on the cornea, as it may form an insoluble chloride of silver and cause permanent opacities. Nitrate of silver is used to stimulate indolent ulcers, and to burn off warts. To stimulate ulcers, touch in spots around edge; also used in chorea, epilepsy and chronic spinal disease, but results are uncertain in these latter three It is also used for foot-rot in sheep; a piece of the caustic is placed in sinuses of fistulous withers, quittors, etc. It causes slough, followed by healthy granulation; used for sore teats in cows.

CUPRUM—COPPER—CUPRI ACETAS—ACETATE OF COPPER—VERDIGRIS.

Not official; is stronger than the sulphate, but has about the same uses. The sulphate is preferred.

CUPRI ARSENIS—ARSENITE OF COPPER.

Dose.—Horse, $\frac{1}{3}$ to 15 grs., according to the purpose for which it is used; dogs, 1-100 to 1-40 of a grain. Used almost entirely for diarrhœa and dysentery, where there is a relaxed condition of the muscular walls of the intestines. Quite serviceable in horses that scour.

Cupri Sulphas—Sulphate of Copper—Blue Vitriol—Blue Stone.—Occurs in blue crystals; soluble 1 in 3 of water.

Dose.—Horses, ½ to 1½ drs.; sheep, 10 to 30 grs.; dogs, ⅛ to 2 grs.; cattle, 1 to 3 drs., pigs, 3 to 10 grs.

As a tonic and astringent, repeat two or three times daily; given either in bolus or in some mucilaginous solution, or in powdered form, with some inert substance; when given as a tonic should be given at time of feeding, or right after eating; as an emetic for dogs, 3 to 15 grs. Double this amount for pigs of 100 lbs. weight; dissolve in water. Sulphate of iron is better as a tonic.

Antagonists and Incompatibles.—Alkalies and carbonates, mineral salts, except the sulphates, iodides and most astringent vegetables, are chemically incompatible; in case of poisoning give white of eggs and milk freely, evacuate stomach and give demulcents; it is the best antidote to phosphorus poisoning.

Actions.—Gastro-intestinal irritant, astringent, tonic, emetic in large doses; acts directly on the stomach; antiseptic and vermifuge.

External.—In solid form, caustic, diluted is astringent and antiseptic.

Uses.—Internally used as emetic, antidote for phosphorus, atony of bowels, diarrhœa especially combined with dilute sulphuric acid and sulphate of morphine; is supposed to prevent development of farcy and glanders in exposed animals.

Externally.—Used as a stimulant and caustic, styptic, also used for foot-rot; for granular eye-lids, touch lightly over the granular surface with the sulphate. For tetanus try the following.

℞ Cupri sulph.,
Ferri. sulph. exsic., aa, ℥ jss.
Pulv. bellad. fol.
Pulv. gentian rad., aa, ℥ iij.

M. Ft, Chart No. 12. Sig.—One powder 3 or 4 times daily.

Quinine may be added. This prescription does not constipate.

PLUMBUM—LEAD.

Physiological Actions.—The lead compounds are powerful astringents, hæmostatics, styptics, anodynes, local sedatives and desiccants; they coagulate albumen and form a protective coat, also contract small vessels. In large or continued doses they ir-

ritate, then paralyze voluntary and involuntary muscles, and also the central nervous system.

Toxicology.—Acute lead poisoning is rare; intense gastro-intestinal irritation, vomiting, retching, paralysis, coma, and collapse are its principal phenomena.

Chronic Lead Poisoning.—Blue line along the margin of gums, paralysis of extensor muscles of fore-arm, impaired sensibility, rheumatism without fever or tenderness in joints, which however, are red and swollen, emaciation, albuminuria, colic, constipation, abortion of pregnant animals, inflammation of kidneys; death may occur from paralysis of muscles of respiration or from convulsions and coma; symptoms resemble stomach staggers in the horse and impaction of third stomach of cattle.

Treatment.—Emetics, wash out stomach, give sulphate of soda or magnesia to form insoluble sulphate and to open the bowels; give stimulants, warmth, pot. iodine, oil, etc.

Plumbi Oxidum.—Litharge, red lead, reddish yellow powder or heavy scales, insoluble in water; soluble in nitric and acetic acid; used in making lead plaster or oleate of lead and in Goulard's extract.

Plumbi Carbonas.—Carbonate of lead, white lead; used to make unguentum plumbi carbonatis.

Uses of Oxide and Carbonate.—Used as desiccants and astringents, mixed with linseed-oil, glycerin or vaseline, they form antiseptic, astringent and protective coverings for burns, skin diseases, scratches, collar galls, etc. There is also an iodide of lead, ointment of iodide of lead and a nitrate of lead.

Plumbi Acetas—Acetate of Lead—Sugar of Lead.—Occurs in white crystalline masses of a sweetish taste, soluble in 2 parts of water at 60 per cent F.

Dose.—Horse and cattle, ½ to 1 dr.; sheep and calves, 5 to 20 grs.; pigs, 1 to 5 grs.; dogs, ¼ to 4 or 5 grs. given in bolus or solution.

Uses.—Administered internally to check hæmorrhages, especially of the stomach and lungs, has been used in purpura in horses with varying results; it is said to be very good in red water of cattle; also used in diabetes insipidus; for diarrhœa, lead acetate with opium is very good, also in dysentery, chronic scouring, and bronchorrhœa; it is occasionally prescribed as a gargle.

Externally.—Used in solution to check superficial inflammation; used on burns, bruises and ulcers, also to cool and relieve strained and inflamed tendons and joints, it is also used as a wash to abate the itching of nettle-rash and erythema, and other skin diseases; also serviceable in eczema, and grease-heal; used in eye-wash but should not be used when there is an abrasion of the cornea, as insoluble compounds are formed; the acetate may be used as an ointment or powder or in solution dissolved in 20 to 40 parts water, a little vinegar or acetic acid increases its solubility; it is used in white lotion as follows:

℞		
	Zinci Sulphatis	ʒ vi.
	Plumbi Acet.	ʒ i.
	Aqua	Oj ss.

M. Sig.—Apply 4 or 5 times daily for collar galls, sore backs, etc.

Goulard's extract is superior for strained and inflamed tendons.

Liquor Plumbi Subacetatis—Goulard's Extract.—Composed of acetate of lead 170 pts., oxide of lead 120 pts., boiled together in water to make 1000 pts. A dense, clear, colorless liquid, sweet, astringent taste, alkaline reaction, decomposed by exposure to the air.

Liq. Plumbi Subacetatis Dilutus—Diluted Solution of Subacetate of Lead—Goulard's Water.—30 pts. Goulard's extract to water to make 1000 pts. There is also a Ceratum Plumbi Subacetatis.

Uses.—Four to five ounces of Goulard's extract to the pint of water is used for sprains, bruises, cuts, burns, scratches, grease-heel, etc. For painful affections Tr. of opium 4 to 6 ozs. to 1 pint, or belladonna about 2 ozs. to the pint are added. These subtances when combined are chemically incompatible but therapeutically active. Goulard's extract 1 part, lard-oil 4 to 6 parts; makes a good dressing for blistered or bruised surfaces, grease-heel and other ailments of that class; for skin disease, eczema, canker of ear in dogs, etc., use the following.

℞		
	Liq. plumbi subacet,	ʒ i.
	Glycerini.	ʒ ii.
	Aq.	ʒ ii.

M. Sig.—Apply 3 or 4 times daily, but in treating canker of the ear for the first 4 or 5 days use per oxide of hydrogen first.

Antagonists and Incompatibles.—Lime, sulphates, carbonates,

mineral acids, mineral salts, vegetable acids, alkalies, potassium, iodide, vegetable astringents, albuminous solutions and opium preparations.

Synergist.—Cold water, digitalis, ergot, veratrum viride, and similar astringent agents, and waste producers favor the action of lead.

ZINCUM.

ZINCI OXIDUM.—Yellowish white powder, insoluble in water.

Dose.—Horses and cattle, 2 to 4 drs.; dogs, 1 to 6 grs. Not much used internally.

Actions and Uses.—Used chiefly as a dusting powder for wounds and excoriated surfaces; used alone or combined with boric acid, subnitrate of bismuth, calomel or in the form of the UNGUENTUM ZINCI OXIDUM (official) is desiccant, mildly astringent and protective; it is sometimes used in chorea, epilepsy and other nervous diseases. Prescription for healing powder:

℞ Zinci oxid., ℥ ii.
Ac. boric, ℥ ii.
M. Sig.—Apply several times daily.

Calomel added to above increases the drying properties. If there is any itching or irritation add subnitrate of bismuth 1 oz. For good, cheap healing salve use the following:

℞ Ungt. zinci oxid., ℥ iii.
Plumbi acet., ℥ iii.
Petrolatum, ℥ iv.
M. Sig.—Apply.

To change its white color, powdered curcuma is used, about 1 dr. to the 1 oz. Gives a yellow color.

ZINCI CARBONAS PRECIPITATIS—PRECIPITATED CARBONATE OF ZINC.—There is also a CERATUM ZINCI CARBONATIS; action and uses the same as oxide of Zinc; also the ZINCI VALERIANAS—VALERIANATE OF ZINC.—Used as a nerve tonic in chorea. Dose for dog, ⅛ to 2 grs.

ZINCI CHLORIDUM.—White deliquescent salts, wholly soluble in water, alcohol and ether. LIQUOR ZINCI CHLORIDI, aqueous solution of zinci chloridi, containing 50 per cent by weight of salt. Make your own solution; chloride of zinc is used externally only.

Actions.—Is caustic and escharotic, used full strength or in a strong solution, penetrates very deeply and causes deep sloughing; an irritant and corrosive poison; mild medicinal solutions are antiseptic and astringent; is also disinfectant and deodorizer.

Uses.—Can be used as caustic, when indicated; use with caution, for granulations in chronic ulcers and foot-rot in sheep; to slough out all kinds of fistula, usually mixed with 1 or 2 parts of flour made into a paste with water, 2 to 3 per cent solution or 2 to 4 drs. to the pint of water as used for ordinary astringent purposes and as a parasiticide.

For conjunctivitis:

℞	Zinci chloridi,	grs. ii. to iv.
	Atropinæ sulphatis,	grs. iv.
	Aq. destil.,	℥ viii.

M. Sig.—Apply to the eye with soft sponge.

It is also a safe wash for inflamed cornea.

Zinci Sulphas - Sulphate of Zinc.—Occurs in colorless crystals, which effloresce on exposure to air; soluble 1 to in 7 parts water.

Dose.—Horse, ½ to 1½ drs.; sheep, 10 to 20 grs.; lambs, ¼ to 3 grs.; cattle, 1 to 2 drs.; calves, 10 to 30 grs.; dogs, ¼ to 5 grs. These doses are astringents and tonics; as an emetic for dogs, 5 to 20 grs.

Physiological Actions—Irritant, emetic, astringent, antiseptic and nerve tonic. Externally it is used as a stimulant, astringent and antiseptic; in dogs it is a prompt and efficient emetic, causes no depression and acts both on the stomach and nerve centers; poisonous or long continued large doses in horses dry up the secretions, cause nausea, colic and efforts to vomit; dogs cannot be poisoned by it as it causes vomiting.

Uses.—As a tonic is inferior to iron; chief use is externally as an astringent; It is used in white lotion; sometimes used internally with opium to stop excessive sweating, in frequent small doses. Used as a safe and prompt emetic for dogs and pigs.

Externally.—Used in solution as an astringent and stimulant for wounds, ulcers, simple ophthalmia, and irritable conditions of mucous membrane of uterus or vagina and urethra, vesicular and pustulant skin eruptions. Proper strength, 1 oz. to the 1 qt. of water. For conjunctivitis or canker of the ear:

℞

Zinci sulphatis,	grs. iii. to viii.
Morphinæ sulphatis.	grs. iii. to vi.
Atropinæ sulphatis,	grs. i. to ii.
Aq. destillata,	℥ i.

M. Sig.—For the eye or ear apply several times daily in small quantities.

ZINCI ACETAS—ACETATE OF ZINC.

Actions and Uses.—The same as the sulphate; it is the acetate of zinc which is the soluble agent in white lotion, caused by the acetate of lard, and sulphate of zinc changing their composition.

Antagonists and Incompatibles of the zinc salts in general. Lime-water, the alkalies and their carbonates, nitrate of silver and the vegetable astringents are incompatible with the zinc salts, also with acetate of lead.

Antidotes.—Lime-water, mucilaginous drinks, milk, tannic acid and the carbonated alkalies, common soap, etc.

Synergist.—Mercurial, silver, antimonial and copper preparations favor the action of zinc salts.

ALUMEN—ALUM.

The official alum is known as ALUMINUM and POTASSIUM SULPHATE OR POTASSIUM ALUM.

Dose.—Horse, 1 to 3 drs.; sheep and pigs, 10 to 40 grs.; dogs, 1 to 15 grs. It is soluble in 9 parts of water at 59° F, very soluble in hot water. Occurs in large colorless, octahedral crystals, of an acid, sweetish, astringent taste.

ALUMEM EXSICCATUM—DRIED ALUM.—Commonly termed burnt alum, is alum deprived of its water or crystallization by heat, a white granular powder, odorless but having a sweetish astringent taste, soluble in 20 parts of water at 60° F. Is a powerful astringent and escharotic.

ALUMINIS SULPHAS—SULPHATE OF ALUM.—Soluble in 1 to 2 parts water by weight. Is antiseptic, astringent and caustic.

Antagonists and Incompatibles.—Alkalies and their carbonates and acetate of lead are chemically incompatible.

Synergist.—Mineral and vegetable astringents promote its therapeutical activity.

Physiological Actions.—Astringent, at first excites flow of saliva, then markedly decreases it; coagulates pepsin, thus it would derange or entirely arrest digestion; it also stops peris-

talsis and produces constipation, though sometimes it induces diarrhœa by irritation. It arrests secretion in general and in the circulation constricts the capillaries; it is in this way it arrests secretions, especially those of mucous surfaces and stops capillary hæmorrhage; it is an emetic in 15 grs. to 1 dr. doses for dogs; large doses are gastro-intestinal irritants. The sulphate of aluminum is mildly caustic, astringent and antiseptic.

Uses.—In diarrhœa and dysentery, but other astringents are safer and better, as it may lock the bowels too tight, may be used in weeping sores or weeping skin diseases; in long standing nail wounds by putting ½ lb. into the soaking tub, also in same way for injured coronets, with raw bulging surfaces that bleed easily; also for sore mouth, sometimes mix a little boracic acid; useful in bleeding piles, and in mild solution for sore throat; also used internally for hæmaturia (bloody urine), and for open joints apply the powdered alum to arrest the flow of synovia. For catarrhal ophthalmia, after the acute stage an alum lotion 5 to 10 grs. to 1 oz. of water is very serviceable; for granular lids rub with a crystal of alum. Alum should never be used too strong over the eye as it seems to have the power of dissolving the cornea; dried alum may be used as a caustic wherever a caustic is indicated, but is not recommended for this purpose.

VEGETABLE ASTRINGENTS—ACIDUM TANNICUM—TANNIC ACID—TANNIN.

Character.—Yellowish white color or pale yellow, strongly astringent taste, soluble in about one part of water, in 6-10 parts of alcohol, and in one part of glycerin with moderate heat, or 6 parts cold glycerin.

Dose.—½ to 2, or even 4 drs., according to purpose. Cattle, 1 to 3 or up to 5 drs.; lambs, ½ to 1 or 2 grs.; sheep and pigs, 15 grs. to 2 drs.; dogs, 1 to 10 or 20 grs.

Preparation of Tannic Acid, Collodium Stypticum, Styptic Collodion.—Composed of tannic acid 20 parts, alcohol 5 parts, strong ether 25 parts, and collodion sufficient to make 100 parts.

Unguentum Acidi Tannici.—Ointment of tannic acid; tannic 20 parts, benzonated lard, 80 parts.

Glycerinum Acidi Tannici.—20 parts tannin and 80 parts glycerin.

ACIDUM GALLICUM.—Occurs in small silky, nearly colorless crystals. There is also an ointment of gallic acid. Tannic acid and its preparations are more astringent and generally preferred in veterinary practice. The following remedies contain tannic acid and their physiological actions and therapeutical uses are due to its presence.

GALLA—NUT GALL.—Of this we have a tincture and an ointment, but the tannic acid is preferred.

CATECHU.—An extract prepared principally from wood of acacia catechu.

Dose of powder.—Horse, 1 to 6 drs.; pigs, ½ to 1— drs.; dogs, 1 to 20 grs.; cattle double, sheep ½ as.

TINCTURA CATECHU COMPOSITA—COMPOUND TR. OF CATECHU.—Composed of catechu, cinnamon and diluted alcohol.

Dose.—Horse, ½ to 2 ozs.; lambs, 10 to 30 grs.; dogs, ½ to ½ ms.; sheep and pigs, ½ to 1 dr.; calves, ½ to 1 drs.

These doses are sometimes considerably increased, and are very good in diarrhœa of small and young animals.

KINO—TINCTURA KINO.—Dose double that of catechu, also very nice in small and young animals.

QUERCUS ALBA—WHITE OAK BARK.—There is no official preparation of white oak bark.

DECOCTUM QUERCUS ALBÆ.—Decoction white oak bark (not official), made by using 1 oz. to 1 pt.

Dose.—Colt, ½ to 2 ozs.; cattle, 1 pt.; sheep and pigs, 2 to 8 drs.; horses, 4 to 8 ozs.; calves, ½ to 2 ozs.; lambs, 1 to 4 drs. These doses may be doubled and tripled; used in diarrhœa.

HAMAMELIS (leaves) WITCH HAZEL—EXTRACTUM HAMAMELIDIS FLUIDUM, distilled extract of witch hazel.

Dose for dogs of Fluid Extract, ½ oz. to 2 drs. Mostly used as a household remedy for human beings.

Antagonists and Incompatibles.—Of tannic and gallic acids and substances containing them, the mineral acids, salts of antimony, lead and silver and the persalts of iron and alkalies are chemically incompatible. The vegetable alkaloids and gelatin form insoluble precipitates.

Synergists.—Tonics and bitters as a rule favor the action of tannic and gallic acids, and the substances containing them.

Physiological Actions.—Astringency is their chief action, tannic acid is more powerful than gallic acid; it precipitates pep-

sin, coagulates albumen, impairs digestion, stops peristalsis and causes constipation; it is the best antidote for poisoning by the alkaloids as it forms insoluble tannates.

Uses.—Wherever a powerful astringent is indicated; in diarrhœa, tannic acid with opium and sub-nitrate of bismuth; in purpura hæmorrhagica, etc. Gallic acid acts on more remote parts than does tannic acid.

External Uses.—In eczema, use tannic acid with glycerin and water in the weeping stages; tannic acid and opium as an astringent and anodyne wash in prolapsus of uterus and rectum; the same in canker of the ear in dogs. In piles use ointments, or suppositories, of tannic or gallic acids with opium if much irritability exists.

Prescription for piles:

℞ Ungt. acidi tannici, ℥ ss.
Ungt. bellad., ℥ ss.
Ung. Stramonii, ℥ ss.
M. Sig.—Apply several times daily.

Styptic collodion is painted over raw bleeding surfaces. Tannic acid in solution makes a useful mouth-wash, in sore or tender mouthed horses, also for collar, harness and saddle galls, to heal and toughen the parts, 1 to 2 ozs. to the pint of water, sometimes used stronger and sometimes, full strength. Finely powdered tannic acid is sometimes blown into the eye for granular ophthalmia, chronic granulations and ulceration of cornea; causes but little pain for a moment and does not inflame. For cracked teats in cows, glycerite of tannin is very good, also used as a gargle, in weak solution, in throat diseases.

COLCHICUM—MEADOWSAFFRON.

The root and seeds are used.

Preparation of the Root.—Extractum Colchi Radicis Fluidum; fluid extract of colchicum root; there is also a wine 40 per cent strength and an extract of the root.

Preparation of the Seed.—Extractum Colchici Seminis Fluidum, fluid extract of the seed; there is also a tincture and wine 15 per cent strength. The use of the seed and root are claimed to be about the same, but Dr, Quitman recommends the seed.

Dose of the seed and root.—Fluid Extract or powdered,

horse, 1 to 2 drs.; sheep and pigs, 5 to 20 ms.; cattle, 2 to 3 drs.; dogs, ½ to 10 mins. The powdered colchicum is used a great deal; dose about the same as the Fluid Extract.

Composition.—Contains tannic acid, gallic acid and colchicine.

Antagonists and Incompatibles.—For tannic acid poisoning, empty stomach and give demulcents and stimulants.

Synergists.—Drugs having similar actions.

Physiological Actions.—Bitter taste, sialagogue, stimulates secretion of stomach, intestines, liver, kidneys and skin; large doses cause gastro-intestinal irritation and depression of the heart; medicinal doses increase the flow of urine, especially of its solid constituents (urea, uric acid, etc.) as well as the water; to sum up it actions, it is alterative, emetic, diuretic, diaphoretic hepatic stimulant and drastic cathartic (the last in large doses) also cholagogue. It is a local irritant, consequently must ALWAYS be diluted.

Therapy.—In human practice it is the great remedy for gout. In veterinary practice colchicum combined with potassium nitrate salicylic acid or salicylate of soda is used in rheumatism. It is used in dropsical conditions with digitalis; in constipation with nux vomica and physostigma, as follows:

℞ Fl. ext. nucis vom., ℥ vi.
Fl. ext. colchici sem., ℥ iss.
Fl. ext. physostigmatis. ℥ i.
Aq. qs. ad., ℥ xii.
M. Sig.—One oz. every two hours.

In Hepatic Congestion.—Use colchicum and belladonna.

In Cerebral Congestion.—Colchicum combined with ergot and potas. bromide with a saline purgative; it is also used in lymphangitis. In azoturia combine it with gelsemium, belladonna and spts. nitrous ether. In azoturia where you cannot get up a good free action of the kidneys, rub tr. of digitalis on the loins over the region of the kidneys; a purgative, is also indicated; gelsemium is also given to keep down delirium.

GUAIACUM—LIGNUM VITÆ.—Used chiefly in dog practice.

TINCTURA GUAIACI AMMONIATA.—Horse, 1 to 3 ozs.; dogs, 3 to 30 ms.; guaiaci for dogs, 5 ms. to 1 dr.

Actions.—Is diaphoretic, expectorant and alterative, it is irritant and should be diluted, chiefly administered for its expectorant actions.

Used in rheumatism, catarrhal conditions, parotiditis, etc.

Stillingia—Queen's Root.—The preparations of this should be made from the fresh root. Dose of the Fluid Extract for horse ½ to 2 ozs.; dogs, 5 ms. to 1 dr.

Actions.—Chiefly used as alterative, is also expectorant, diaphoretic, diuretic, purgative, cholagogue, sialagogue and cardiac stimulant.

Used in blood poisoning, alternated with iron and potas. iodide. In human practice it is recommended for ascites, (abdominal dropsy); in chronic constipation of dogs it is very useful as a laxative, and in hæmorrhoids.

Sanguinaria—Blood Root.—Dose of the Fluid Extract, as an expectorant and stimulant, for horse, 1 to 3 drs.; dogs, as expectorant and stimulant ½ to 5 ms. and as an emetic for dogs 5 to 40 ms.

Actions.—Systemic emetic, expectorant, emmenagogue, cardiac paralyzer, a violent irritant and alterative, locally is feebly caustic.

Uses.—Said to be very good in chronic nasal catarrh, acute and chronic bronchitis and asthma, (or heaves).

Xanthoxylum—Prickly Ash.

Dose of Fluid Extract.—Horse, ½ to 2 ozs.; dogs, 5 to 60 ms.

Actions.—Diaphoretic, diuretic and sialagogue; increases secretion of stomach, intestines, liver and pancreas; increases action of heart and raises arterial tension. Locally it is an irritant.

Uses.—Chronic pharyngitis; said to be very good in jaundice, chronic rheumatism, myalgia, (muscular pains), lumbago and paralysis of the tongue, the powdered drug is used. Dose about the same as the Fluid Extract.

Viburnum Opulus—Cramp Bark—Viburnum Prunifolium—Black Haw.

Dose of the fluid extract for mares, 1 to 4 ozs. two or three times a day is the average dose; cows, 2 to 4 ozs,; bitches, 10 to 30, and up to 60 ms.

Physiological Actions.—Is tonic, astringent, antispasmodic, nerve sedative, and anti-abortive; it is a sedative and tonic to the uterine and ovarian nerve centers.

Uses.—Used to prevent habitual aborting. Commence 1 to

2 months before the usual time of abortion and give it right along two or three times daily; if called at the time they are about to abort, give one big dose, to the mare about 4 ozs. It is said to prevent abortion even when labor pains are on, provided the membranes are not detached and the fœtus is alive, then follow up with smaller and repeated doses two or three times a day.

The viburnum prunifolium is most used and recommended by Dr. Quitman; Bartholow thinks the viburnum opulus would be the best.

ANTISEPTICS.

Used to destroy or prevent the growth of germs.

HYDROGEN PEROXIDUM—PEROXIDE OF HYDROGEN—HYDROGEN DIOXIDE.

Chemical Formula.—H_2. O_2.

The commercial peroxide of hydrogen is a colorless solution of this agent in water; is without odor, harsh, slightly acrid taste, and readily yields oxygen at ordinary temperatures; should always be kept in a cool, dark place and well corked. Is usually of 15 volume strength, or about 3½ per cent of the gas dissolved in water. The best make is Marchand's. We also have a Mallinckrodt's make, which is most often used in veterinary practice, as it only costs 35 cents per lb., while the Marchand's costs 65 cents per pound.

Actions and Uses.—Pre-eminently an antisuppurant, destroying pus and the microbes of suppuration, as well as pyogenic membranes. Is free from irritating qualities; it is injected into sinuses, abscesses, fistulous openings, applied to fresh wounds to prevent suppuration, used on the hands and instruments, can be injected into tender places, such as uterus in metritis, etc.; best in this case to dilute one-half with distilled water. Used in canker of ear in dogs, fistulous withers, quittors, etc. Wash for sore throats, purulent ophthalmia, injection for sinuses after trephining for nasal gleet, etc. Use dilute hydrochloric acid 1 to 4 to stop fetid odor after trephining and to dissolve necrosed bone.

Internally.—Is a powerful promoter of the appetite; used in gastritis, gastric flatulence, etc.; can be given to dogs from 15 ms. to 2 or 3 drs. doses; horses, ½ to 2 or three ozs., diluted

two or three times daily. When it comes in contact with pus it produces a frothy foam; as long as the foam comes back yellow there is pus in it, but when it comes back clear or white the pus is all out.

Calx Chlorata—Chlorinated Lime—Chloride of Lime.—Bleaching powder, is used almost entirely as a deodorizer and disinfectant, is very good for destroying foul odors; occurs as a grayish white substance, in powder or friable lumps, should contain at least 25 per cent of chlorine, and should be sprinkled around on barn floors where there has been any disease or dead animals.

Acidum Carbolicum—Carbolic Acid—Acidum Phenicum—Phenic Acid—Phenol.—Is the product of the distillation of coal-tar; occurs either in acicular crystals or in crystalline masses, white or colorless when perfectly pure, but when slightly impure, either reddish or becoming so by exposure; deliquescent and readily assuming the liquid state in the presence of a little water, yet not dissolving, of a strong odor and taste, is soluble in 15 to 33 parts of water, the purest being most soluble; alcohol, ether, chloroform, glycerin and the essential oils dissolve it freely.

Dose.—Horse, 10 to 40 grs.; sheep and large pigs, 5 to 10 grs.; dogs, 1-20 to 2 grs., well diluted.

Acidum Carbolicum Crudum.—Impure Carbolic Acid.—Usually of a brownish color, used entirely as a disinfectant and deodorizer for privy vaults, stables, to wash walls, etc., after glanders and other contagious diseases.

There is also a glycerite, strength 1 to 4, and an ointment of carbolic acid, strength 10 per cent, used for external purposes.

Creosote.—Is very similar to carbolic acid, but is not as powerful a toxic agent; used in human practice internally; it is not so irritating; dose about one-third more than carbolic acid; given well diluted. Carbolic is made from coal-tar, and creosote from wood-tar, the best from beach-wood.

In case of poisoning from carbolic acid, give carbonate of lime, carbonate of magnesia, or as it is apt to be more handy, the sulphates of magnesia or soda, or vegetable demulcents, but no oil or glycerin, as they favor its action. Atropine is the best physiological antidote for the systemic effects of carbolic

acid. Give diluents freely, also sulphate of magnesia or soda, in solution and atropine hypodermically, vinegar or acetic acid internally and locally is probably the best antidote.

Actions.—Large and diluted doses are irritant and narcotic poison; it is used as an antiseptic, antiparasitic, occasionally as a local anæsthetic or anodyne in a 2 or 3 per cent. solution; also as a caustic; but should not be used as a caustic, as a burn from it heals very slowly. Used internally it usually contracts the pupil, although occasionally dilates it. It is used internally as a gastric sedative in small doses for vomiting in dogs; is administered in various contagious and zymotic diseases, with the view of preventing or arresting the development of micro-organism; it coagulates albumen, is not nearly so active as corrosive sublimate; 1 to 500 prevents the growth of anthrax and other bacilli (according to Koch). Full doses besides producing local caustic effects, causes gastro-enteritis, and collapse, which may end fatally; it is a muscular and nerve paralyzer, both internally and externally, kills by paralyzing the muscles of respiration and the heart. It is chiefly excreted by the kidneys, coloring the urine a brownish hue.

Uses.—In surgery as indicated, usually a 3 to 5 per cent solution for injecting into wounds, 2 or 3 per cent for hands, for itching of the skin, carbolic acid 3 or 4 drs., glycerin 2 ozs. to 1 pint of water.

Internally.—¼ gr. doses with bismuth subnitrate and glycerin is almost a specific for vomiting in dogs; as prescribed in enteric influenza, diarrhœa, dysentery, flatulence, etc. Dr. Quitman condemns the use of carbolic acid as an antiseptic for wounds and sores on account of its paralyzing effects.

For vomiting in dogs; a prescription for 12 doses:

℞ Ac. carbolici, grs. iij.
Bismuthi subnit., ʒ i. to ij.
Tr. opii camph., ʒ ss to j.
Glycerini, ʒ ss.
Aq. cinnamonia qs. ad., ʒ jss.
M. Sig.—Teaspoonful every 2 hours.

If first dose is vomited repeat every 10 or 15 minutes till retained.

Charcoal, Carbo Ligni—Wood Charcoal—Carbo Animalis.—Animal Charcoal. (Prepared from bone.)

Actions.—Is desiccant, antiseptic, disinfectant, deodorant, absorbent and antacid.

Uses—Internally.—In 2 drs. to ½ oz. doses, combined with sulphur, is useful in urticaria; useful to apply over fowl wounds, and mixed in poultices is very good for grease-heel and mud-fever. Is occasionally prescribed in diarrhœa and flatulence.

Creolin.—That made by Pearson or Merck is the best. It is a coal-tar preparation, and is a dark brown liquid.

Actions.—Is a non-poisonous, non-irritating and cheap, but powerful antiseptic and parasiticide, more powerful than carbolic acid; it is used pure, in solution or in an ointment in strength of 1 to 50 to 1 to 20. Used internally, occasionally, in gastric fermentation, dysentery and typhoid fever, and locally as an antiseptic. In mange it is used in 5 per cent solution. Glycerin renders it more soluble.

Dose.—Horses and cattle, 2 to 6 drs.; dogs, 5 to 20 ms.

Staphisagriæ Semina—Stavesacre Seeds.

Actions and Uses.—The seeds are used for the destruction of lice and flees, for which they are a most effectual remedy; for such purposes 1 oz. of crushed seeds are boiled in 20 or 30 ozs. of water, then add water to the quantity originally used, and use as a wash; or, seeds, 1 to 1½ ozs., aqua, 1 quart, boil down to 1½ pints, then add water to make a quart.

Ointments are made with one part of powdered seeds to 6 of lard.

Salicinum—Salicin.—A neutral principle obtained from several species of the willow and poplar tree; occurs in silky, colorless, shining crystals, permanent in the air, odorless, very bitter and neutral in reaction, soluble in 28 parts of water and 30 parts of alcohol.

Dose.—Horse, ½ to 2 ozs.; dogs, 10 grs. to 2 drs.

Actions.—Bitter tonic, antipyretic, antiferment and antiseptic, somewhat antiperiodic, resembling quinine in its actions, but not as powerful.

Uses.—Used in febrile conditions about the same as quinine, its chief use is in acute rheumatism, for which it is a very good remedy; as a diaphoretic is used in large doses.

Acidum Salicylicum—Salicylic Acid.—This is an organic acid, existing naturally in various plants, but most largely prepared synthetically from carbolic acid, occurs in needle-shaped

crystals, soluble in alcohol, ether and hot water; borax increases its solubility.

Dose.—Horse, 2 to 6 drs.; swine, 30 to 40 grs.; dogs, 5 to 20 grs.; cattle, ½ to 1 oz.; sheep and goats, 1 to 2 drs.; should be given well diluted; larger doses are recommended for fevers, but smaller doses more often repeated in rheumatism.

Sodii Salicylas—Salicylate of Soda.—Dose same as for salicylic acid.

Antagonists and Incompatibles.—Of salicylic acid and salicylate of sodæ; mineral acids, metallic salts and preparations of iron in general are chemically incompatible; physiologically, they are antagonized by the arterial and cerebral stimulants.

Synergists.—Members of the phenol group, arterial depressants, anæsthetics and cerebral sedatives.

Physiological Actions.—Powerful antiseptic, anti-rheumatic, diaphoretic, cardiac depressant, antiferment, and antipyretic. Salicylic acid is in addition irritant and astringent, continued in large doses is apt to derange digestion; best to be administered on an empty stomach.

Uses.—For flatulence, acute rheumatism, influenza, strangles and purpura where there is much sloughing; also as a surgical wash, salicylic acid 1 part, borax 1 part to 30 to 50 parts of water. Salicylic acid is a more powerful antiseptic than carbolic acid. Salicylate of soda is feebly antiseptic; salicylic acid is indispensable in intestinal flatulence.

For acute rheumatism and general muscular soreness:

℞

Quin. Sulph.	℥ i.
Sodii salicylatis,	℥ iij.
Pulv. cimicifugæ,	℥ iij.
Pulv. Bellad. fol.,	℥ ij.

M. Fiat. Pulv. No. 12. Sig.—One powder every four hours.

Resorcina—Resorcin.—Is antiseptic, not much used internally, too depressing, locally is a non-irritating antiseptic, used in skin diseases and inflammation of the eyes, 1 to 10 parts to 100 parts of water. Ointments are used in 5 to 30 per cent strengths.

Salol.—Is a salicylate of phenol, a white crystalline powder, insoluble in water, composed of salicylic acid 60 parts and carbolic acid 40 parts by weight.

Dose.—Horse, 2 to 4 drs.; dogs, 2 to 30 grs.; other animals the same as salicylic acid.

Actions.—Antiseptic, anodyne, antipyretic, anti-rheumatic, anti-ferment, diuretic.

Uses.—Chiefly for rheumatism and is very good, does not irritate stomach nor derange digestion. For distemper in dogs, strangles and influenza in horses.

Prescription for acute rheumatism, or muscular pains, lumbago, etc.:

℞ Saloli, ʒ ii.
Pulv. bellad. fol., ʒ ii.
Quin. sulph., ʒ v.
M. Ft. Chart No. 12. Sig. 1 every 3 hours.

For distemper in dogs combine salol with quinine.

Pyoktanin.—Technically known as methylene blue, used to restrain suppuration, in strength of 1 to 1000 to 1 to 100. Occurs in small indigo colored scaly crystals. Slightly soluble in water; stains the skin blue; very noticeable on white horses. Peroxide of hydrogen is preferred to pyoktanin.

There is also a yellow Pyoktanin, but the blue is the strongest. Pyoktanin is used for ulcers of the cornea, serous iritis, ulcers and pus secreting sores in general.

Naphthalinum—Naphthalin.—A dry product of gas manufactured after purification; it occurs in brilliant rhombic crystals of an aromatic acrid taste, insoluble in water, but soluble in alcohol, ethers and oils.

Dose.—Horse, 1 to 3 drs.; sheep, 5 to 15 grs.; cattle, 2 to 4 drs.; dogs, 1 to 15 grs. In intestinal flatulence, in severe cases these doses can be doubled.

Actions.—A true intestinal antiseptic and antiferment, also expectorant.

Uses.—Flatulence, best in intestinal flatulence, in diarrhœa and dysentery; is of great value in these ailments, quickly allays foul odor of the evacuations of the bowels; large doses irritate the kidneys and cause bloody urine which ceases upon withholding the drug. When powdered on a wound, as wire cuts, etc. will keep away flies and other insects, besides it is a powerful antiseptic and promotes the healing of wounds.

Naphthol.—Same action and uses as naphthalin, but the dose is only ½ as much. Naphthalin is preferred in veterinary practice.

Exalgine.—Occurs in colorless crystals, odorless, tasteless, slightly soluble in water and freely so in alcohol.

Actions.—Powerful anodyne, nerve sedative, slightly antiseptic and distinctly antipyretic, large doses cause convulsions, dyspnœa, stupor and death.

Uses.—It is the very best drug for chorea in dogs; for average size dogs commence with 1 gr. 3 times a day for 3 days, then 2 grs. 3 times a day for 3 days, then 3 grs. 3 times a day and keep up the 3 grs. 3 times a day. Dose for man 2 to 8 grs.

ANTIPYRIN.—A whitish powder, soluble in equal parts of water by weight; best administered alone.

Dose.—Horse, 1 to 4 drs.; sheep, 1 dr.; cattle, 2 to 6 drs.; dogs, 1 to 15 grs.

Actions.—Powerful antipyretic, anodyne and local anæsthetic, antiseptic, cardiac depressant; it reduces temperature very quickly, usually within ½ hour and the effects continue 2 or more hours. It can be administered by the mouth, hypodermically or intratracheally; as an antipyretic it diminishes oxidation, and promotes heat loss by dilating the cutaneous vessels.

Uses.—Used in high fever where the temperature must be reduced quickly, as in sun-stroke and acute rheumatism; in man a solution of antipyrin from 10 per cent strength up, is sprayed into the nostrils for hay-fever. Acetanilid is a better, safer and much cheaper drug, for febrile diseases.

PHENACETIN.—Dose—Horses and cattle, 2 to 4 drs.; dogs, 2 to 15 grs. repeated every 3 or 4 hours; seldom used for the large animals.

Characters.—Colorless, tasteless, odorless, glistening scaly crystals, sparingly soluble in cold water, more freely in boiling water, alcohol and acetic acid.

Actions.—Like acetanilid and antipyrin, it lowers temperature and diminishes pain, and is hypnotic, its action is less rapid, but more prolonged and less liable than the others to produce collapse, it slows the pulse and relieves respiratory difficulty, the effects continuing for 4 hours.

Uses.—In high fevers or any febrile condition. In rheumatism and influenza use phenacetin and salol combined. In distemper of dogs: Phenacetin, 5 grs., salol 5 grs. every 3 or 4 hours, with stimulants.

ACETANILIDUM—ACETANILID.—Known by the trade term ANTIFEBRIN, a derivative of aniline, best of this class for veterinary use on account of its cheapness and satisfactory effects, a

white crystallized powder, odorless, a slight characteristic but not disagreeable taste, soluble 1 part in 50 of hot water (at 105 F) readily soluble in alcohol 3 in 5, and in aromatic spirits of ammonia.

Dose.—Horse, 1 to 3 drs.; sheep, ½ to 1 dr.; cattle, 2 to 4 drs.; dogs, 2 to 10 grs. repeated every 3 or 4 hours.

Actions.—It is a powerful antipyretic, acting very promptly; is mildly diaphoretic, slightly antiseptic and diuretic, is not irritating or nauseous; is more powerful than antipyrin, and its effects are more lasting; is anodyne, lowers temperature by preventing waste and heat production and increasing radiation. Acetanilid affects the temperature in about 1 hour and its effects are maintained for about 6 hours. Antipyrin manifests its action in about 30 minutes and only lasts for 2 hours. Acetanilid is used in all febrile diseases, chiefly in Thermic fever (sun-stroke) and rheumatism, but in the latter salol, salicylic acid and salicylate of soda are preferred. Antipyrin costs $1.40 per oz., phenacetin $1.00 per oz, acetanilid 12 cents per oz. Antipyrin, Phenacetin, Exalgine and Acetanilid are not as much used as formerly; should only be used when it is essential that fever be quickly reduced when it is excessively high, as in sun-stroke, for which give acetanilid 1½ to 2 drs. dissolved in 1 or 1½ ozs. arom. spts. of ammonia every 2 or 3 hours, and apply cold water or ice to the head and neck.

Acidum Boricum—Acidum Boracicum.—The English name is Boric Acid or Boracic Acid.—Properties; occurs in glittering white scaly crystals, soluble in 26 parts of cold water, in 3 parts of warm water, and freely soluble in alcohol.

Dose.—Horses and cattle, 2 to 5 drs.; dogs, 5 to 20 grs.; foals and calves, 20 to 30 grs.

Actions.—It is a non-volatile, unirritating antiseptic, deodorant and astringent, it arrests fermentation and putrefactive decomposition, destructive of minute organisms, free from irritating effects in solution when applied to wounds; it lessens suppuration, and is as effective as carbolic acid, can be used in any strength from the pure powder or saturated solution to the mildest form.

Uses.—It is indicated for all purposes for which an antiseptic is used; it is used in diarrhœa in foals, calves and dogs, combined with other drugs; it has a slight astringent action of itself, it is

excreted in the urine, consequently would exert its influence on the bladder in cystitis, and cystic catarrh; one part in 800 prevents development of anthrax-bacilli; useful in skin diseases, also used in catarrhal and purulent conjunctivitis, 6 to 10 grs. to the oz. alternated with atropine solution. Useful in distemper of dogs where the bowels are affected, as an antiseptic. Boric-acid is preferred to carbolic acid particularly as an antiseptic for dogs. On account of the paralyzing effect of carbolic acid on the nerves, it hinders the healing of wounds to a certain extent, which the boracic acid does not.

Benzoinum—Benzoin.—This is a balsamic resin, obtained from styrax benzoin; it contains benzoic acid in the proportion 14 to 18 per cent, to which it probably owes its action.

Tinctura Benzoini—Tincture of Benzoin.—We have Adep's Benzoinatus—Benzoinated Lard—composed of 20 parts benzoin to 1000 parts of lard, used as an ointment itself, and as a base for ointments.

Tinctura Benzoini Composita—Compound Tincture of Benzoin.—Composed of benzoin 12 parts, socrotine aloes two parts, storax eight parts, balsam of tolu four parts, and alcohol enough to make 100 parts, commonly known as Friar's Balsam.

Acidum Benzoicum—Benzoic Acid.—White feathery crystals of a peculiar, agreeable odor, and warm, acidulous taste, sparingly soluble in cold water (1 to 500), more soluble in boiling water, 1 in 15, and very soluble in alcohol; borax renders it more soluble.

Dose.—Horses and cattle, 1 dr. to 1 oz.; dogs, 3 to 10 grs., up to ½ dr. for very large dogs.

There is also a Benzoate of Ammonia and Benzoate of Soda. — Same uses and doses as benzoic acid.

Physiological Actions.—Benzoin is a mild stimulant, expectorant and antiseptic; benzoic acid is quite powerful; it renders alkaline urine acid; it is used to dissolve phosphatic calculi.

The tincture and compound tincture are used as stimulants and antiseptics for wounds and sores. Benzoic Acid, when administered internally, acts mildly as an antiseptic to the bladder; useful in catarrh of bladder. Benzoate of soda is used in bronchial catarrh. Benzoate of Ammonia is used to dissolve phosphatic calculi.

ANTISEPTIC OILS.

Oleum Caryophylli—Oil of Cloves.

Dose.—Horse, ½ to 1 dr.; dogs, 1 to 5 drops.

Oleum Cinnamomum—Oil of Cinnamon.—Oil of cinnamon and oil of cloves are stimulant, carminative and antiseptic.

Oleum Gaultheriæ—Oil of Wintergreen.—Used mostly to flavor and give odor to other substances; it has the same actions as the above oils and is given in the same doses.

Oleum Thymi—Oil of Thyme.—A powerful antiseptic, even surpasses carbolic acid, readily soluble in alcohol.

Oleum Cajuputi—Cajuput Oil. - Actions the same as oil of cloves, very effective in parasitic skin diseases also destructive to round worms. Dose—Horse, 15 ms. to 1½ drs.; externally can be used full strength; or diluted, in irritable raw conditions of skin.

AGENTS ACTING ON THE FUNCTIONS OF THE NERVOUS SYSTEM.

Excito-Motors.

Nux Vomica.—Synonym—Dog-button or Quaker buttons. The seeds of strychnos Nux Vomica. See also strychninæ sulphas.

Extractum Nucis Vomicæ—Extract of Nux Vomica.—Dose—Horse, 15 to 30 grs.; pigs, ½ to 3 grs.; dogs, 1-15 to 1 gr.; cattle, ½ to 1 dr.; sheep, 1 to 6 grs.

Extractum Nucis Vomicæ Fluidum—Fluid Extract of Nux Vomica.

Dose.—Horse, ½ to 1 dr.; sheep, 10 to 30 ms.; dogs, ¼ to 5 minims.; cattle, 1 to 2 drs.; pigs, 5 to 20 ms.

Dose of powdered nux vomica:

Horse, ½ to 1½ drs.; sheep, 10 to 40 grs.; dogs, ¼ to 2 grs.; cattle, 1 to 3 drs.; pigs, 10 to 20 grs.

Tinctura Nucis Vomicæ—Tincture of Nux Vomica.

Dose. - Dogs, ½ to 15 ms.

Composition.—Nux Vomica contains strychnine which is the chief alkaloid, also brucine (not official) and strychnic or igasuric acid.

The proportion of strychnine ranges from ¼ to ½ of 1 per cent.

Strychninæ Sulphas.—Occurs as a white salt in colorless prismatics crystals, odorless, exceedingly and persistently bitter,

soluble at 59 F in 50 parts of water, it is sparingly soluble in alcohol, effloresces on exposure to the air; gives the bitter taste when diluted with 1,000,000 parts of water.

Dose.—Horse, 1 to 3 grs.; sheep, 1-5 to 1 gr.; dogs, 1-20 to 1-30 gr.; cattle, 2 to 6 grs.; pigs, 1-15 to ½ gr. One-half of these doses for hypodermic or intratracheal use.

Antagonists and Incompatibles.—The paralyzers, such as woorara, conium, tobacco, opium, belladonna and physostigma, antagonize the actions of strychnine (or nux vomica), in part, but they do not antagonize its toxic action; chloral, tobacco, bromide of potash, ether and chloroform (inhaled) are its true physiological antagonists.

In Case of Poisoning.—Tannic acid, or vegetables containing it should be freely administered, for the tannate of strychnine which is formed is very insoluble; an emetic or the stomach pump must be used promptly.

The tetanic spasms are best controlled by chloral or very large doses of potas. brom. (2 drs to ½ oz. for human) or 4 to 8 ozs. for the horse as antidote for strychnine poisoning. Inhalations of ether are also good. The maintenance of artificial respiration has a decided effect in warding off in animals, as in man the lethal action of strychnine. Strychnine should not be combined with bromides, chlorides and iodides, in the same solution; accidents have happened by taking the last portion, which will contain all of the strychnine precipitated as the hydrobromate, hydroiodate, etc.

Synergists.—Brucine, picrotoxine, thebaine, ergot, belladonna, electricity, cold, etc. promote the activity of nux vomica and its alkaloids.

Physiological Actions.—Nerve tonic, stomach tonic, stimulates respiration, secretion, appetite, and digestion, it increases peristalsis, stimulates both the motor and inhibitory apparatus of heart, and raises arterial tension by stimulating the vaso-motor centers, thus contracting the arterioles, though full doses relax the arterioles and thus lower blood pressure.

Strychnine exalts all the functions of the spinal cord, reflex, motor, vaso-motor and sensory, the latter being the least affected; it does not affect the brain directly. (Strychnine is absorbed more readily from the rectum than from the stomach and

still more rapidly from the bronchi and cellular tissues. Give ½ the oral dose for hypodermic, intratracheal and rectal use.)

Toxic Doses cause trembling and twitching of the voluntary and involuntary muscles, with violent clonic spasms, lasting usually 1 or 2 minutes, gradually getting more frequent and severe, and from involving the glottis, diaphragm and other muscles of respiration, cause death usually from asphyxia. Very large doses may paralyze the cord as from a blow, and cause almost instant death.

The symptoms and mode of death resemble those of tetanus, but are more suddenly developed, more intermittent and more rapidly fatal. The muscular rigidity does not occur as often in tetanus, which first affects the muscles of the jaws, (trismus). The spasms of strychnine poisoning are *clonic* while those in tetanus are *tonic*; horses and cattle are not as susceptible to the effects of strychnine as man and dogs. 6 to 12 grs. are toxic in horses by the mouth, 3 to 6 grs. are toxic in horses hypodermically; 1-10 to 1-6 gr. up, are toxic in dogs by the mouth.

Chloral Hydrate may be given intravenously as an antidote.

Medicinal Uses.—Nux vomica or strychnine is indicated in any condition in which there is a paralysis or depressed state of the nerves or nervous system; atonic dyspepsia, broken wind, relaxed condition of bowels due to lack of tone, in small doses. In weak condition of the heart give with small doses of digitalis or strophanthus; it stimulates sexual organs. Give it in convalescence from debilitating diseases, also as an aid to recovery during their progress; in collapse and for narcotic poisoning strychnine hypodermically, intratracheally or per rectum; in paralysis, whether of limb, intestines or bladder; may be injected into paralyzed muscles; in antepartem paralysis, asthma, and chronic bronchitis; for paralysis commence with small doses of strychnine, and increase until muscular twitching occurs, then lessen the dose.

Constipation.—Nux vomica with colchicum and physostigma in small often repeated doses; for diarrhœa, due to lack of tone of muscular coat of bowels combine with astringents; for anæmia, strychnine combined with iron and quinine; nervous coughs use strychnine with sedatives; also used in incontinence of urine and chorea; in dogs after distemper. The syrupus ferri, quininæ et strychninæ phosphatum, each 1 drachm contains about 1-85 gr.

of strychnine, 1 1/8 gr. of ferri phosphate and 1 2/3 gr. of quinine. Dose 1/2 to 2 dr. makes a good general tonic for dogs.

IGNATIA—ST. IGNATUS BEAN.—Same as nux vomica, same alkaloids, actions and uses, dose a little smaller.

ERGOTA – ERGOT—Synonyms—Secale cornutum, smut of rye, spurred rye, mother of rye, cockspur rye.

EXTRACTUM ERGOTÆ FLUIDUM – FLD. EXT. OF ERGOT.—Dose as an ecbolic for mare or cow, 1/2 to 2 ozs. up; sheep, 1 dr.; swine and bitches, 1/2 to 1 dr.; repeat every 1/2 hour or hour.

POWDERED ERGOT.—Same dose. When it is given in repeated doses for other purposes give smaller doses, except to prevent or check hæmorrhage, then give full doses.

ERGOTOLE.—(Sharp & Dohme manufacturers) is 2 1/2 times stronger than the fluid extract; is non-irritant and can be used hypodermically. Dose.—Horse, 1 to 3 drs.; dogs, 5 to 30 ms.

Antagonists and Incompatibles.—The caustic alkalies and metallic salts are chemically incompatible; aconite, veratrum viride, tobacco and amyl nitrite antagonize the action of ergot on the circulation.

Synergist.—Electricity, cold, digitalis, and belladonna are synergistic as regards the vascular system; savin, rue and gossypium increase its parturient action.

Physiological Actions.—It is a powerful excito-motor, hæmostatic, gastro-intestinal irritant, and ecbolic. It stimulates and contracts voluntary muscular fibers, and hence diminishes the blood stream passing through the arterioles; large and continued doses produce ergotism, which is virtually gangrene, due to lack of blood supply to the parts.

TOXICOLOGY.—In large or long continued doses, or in animals eating ergotized grain it causes poisoning, which is known as ERGOTISM. This is characterized by gastro-intestinal derangement, nausea, diarrhœa and vomiting, in animals capable of emesis, and from the impaired circulation and nutrition, affecting different areas, subsequently assumes two forms, first, dry gangrene, chiefly involving the extremities, (hoofs, ears and tail may slough), or second, nervous symptoms, such as tetanoid spasms, inco-ordinate spasms, and sometimes epileptiform convulsions occur, the latter supposed to be due to irritation and paralysis of the sensory centers or spinal cord; there will also be difficult micturition.

Toxic symptoms are not so marked in horses, cattle and sheep, as in men and dogs; abortion from eating ergotted grasses may occur and affect whole herds; death occurs from coma and asphyxia.

Medicinal uses of Ergot—As a parturient, when the act is prolonged; in uterine hæmorrhage, also to contract blood vessels, previous to an operation to prevent excessive hæmorrhage, especially if varicosities exist; sometimes used to hasten expulsion of the placenta; it is useful in hæmorrhage of any kind; ergot is injected over the region of varicose veins; used in cerebro-spinal meningitis, in dysentery, piles, internally and locally; eversion of uterus; in prolapsus of the rectum; in enlarged heart may be combined with digitalis; in aneurisms. In stallions where erections are feeble or not sufficiently prolonged for proper copulation give ergot combined with strychnine or phosphorus; paralysis of bladder, ergot and strychnine; congestion of the brain, ergot and potas. bromide.

Ustilago – Corn-smut.—Doses and uses the same as ergot, but ergot is the best.

Gossypii Radicis Cortex—Cotton Root Bark.—This drug is very well thought of, it is a substitute for ergot; the Fld. Ext. is the best. Doses and uses the same as ergot.

Digitalis—Fox-Glove.—The leaves of the purple fox-glove are used.

We have the Extractum Digitalis Fluidum.

Dose. - Horses, 20 ms. to 1 dr.; dogs, ¼ to 2 or 3 ms.; cattle, 1 to 2 drs.

Extractum Digitalis.

Dose.—Horses, 10 to 30 grs.; dogs, ⅛ to 2 grs.; cattle, 20 grs. to 1 dr.

Tinctura Digitalis.

Dose.—Horses, 2 drs. to 1 oz.; dogs, 1 m. to 20 minims.

Digitalinum—Digitaline.

Dose.—Cattle, 1 to 2 grs.; horse, ½ to 1 gr.; dogs, 1-100 to 1-30 gr.

Digitalis—Folia Digitalis—Powdered Leaves of Fox-Glove.

Dose.—Horse, 20 grs. to 1 dr.; sheep and pigs, 5 to 10 grs.; cattle 1 to 2 drs.; dogs, ½ to 3 grs. Digitalis contains 5 active

principles, but no alkaloids. They are: DIGITALIN, DIG TOXIN, DIGITALEIN, DIGITIN, DIGITONIN.

Antagonists and Incompatibles.—Cinchona preparations, acetate of lead, sulphate and tr. chloride of iron are chemically incompatible. Tannic acid and preparations containing it diminish the physiological action of digitalis. Opium, aconite, lobelia and the cardiac paralyzers, antagonize some but not all of its actions. The most complete physiological antagonist and best antidote is SAPONIN.

[Saponin is a glucoside, occurs as a white amorphous powder. Dose for human 1-10 to 1-5 gr.; horse, 1½ to 3 or 4 grs.]

Aconite antagonizes the cardiac action of digitalis, and morphine also to a less degree.

Synergist.—Cold, ergot, and belladonna increase its activity.

Physiological Actions.—It is a cardiac and vascular tonic and stimulant, a motor excitant, paralyzant, anophrodisiac, (lowers sexual desire); it is an indirect diuretic and an emetic, irritates the mucous membrane.

On the Heart.—The heart is slowed but the force is increased; digitalis stimulates the cardiac motor ganglia, the inhibitory apparatus and the vaso-motor centers, contracting the arterioles and thereby greatly raising the arterial tension; full doses exhaust and paralyze the heart. As a diuretic its action is very complex, one of the active principles, DIGITALIN, increases the arterial pressure by contracting the efferent vessels of the glomeruli.

The large renal arteries are dilated by two of its active principles, DIGITOXIN AND DIGITALEIN; in that way digitalis is a perfect diuretic.

DIGI'ALIS is said to have a cumulative action, which is affirmed by some authors and denied by others, I have not seen any ill effects in horses from its continued use.

Uses.—It is used as a cardiac stimulant in full doses, followed by small ones; used in heart failure and cardiac debility from any cause, irregularity of heart due to debility; used in dropsical conditions, combined with acetate of pot. or nitrate of pot.; it is useful in congestion of organs, useful in first stages of pneumonia and scarlatina; as a diuretic, can be used internally in azoturia; rub about 2 ozs. of the tr. of digitalis over the region of the kid-

neys, this can be used 2 or 3 times daily; where internal remedies fail to increase the action of kidneys, this is very effectual.

Strophanthus.—Known as Kombe Arrow Poison.

Tinctura Strophanthi.—Only preparation.

Dose.—Horse, 1 to 3 drs.; dogs, ½ to 10 ms.; give large doses first then follow with smaller ones.

Medicinal Uses.—It is prescribed to slow, strengthen and steady feeble or faulty heart action; it acts on the heart like digitalis, but on the arteries but slightly; has diuretic effect, is used in valvular disease of the heart, in hydrothorax, ascitis and other dropsical conditions and in chronic interstitial nephritis; a very good drug, prompt in action. On the heart strophanthus acts more energetic than digitalis, its effects last longer and it is not cumulative.

Scoparius—Broom.—Action is due to sparteine.

Extractum Scoparii Fluidum.

Dose.—Horse, 6 drs. to 1½ oz.; dogs, ¼ to 1 dr.

Sparteinæ Sulphas.—Occurs in small granules.

Dose.—Horse, hypodermically, 1 to 5 grs. every five or six hours; stimulates heart action, but doses of 15 to 30 grs. may be given. Actions are very highly praised; is more prompt than digitalis, is safer, does not raise arterial pressure to such an extent, and action is very much prolonged; acts directly on heart muscle and inhibitory apparatus.

Uses.—For same purpose as other heart stimulants, but is used chiefly as a heart tonic and stimulant.

Cimicifuga—Black Snake Root. Also known as Black Cohosh—Extractum Cimicifugæ Fluidum.

Dose.—Horse, ½ to 3 ozs.; dogs, 5 ms. to 1 dr.

Cimicifugæ Radicis Pulvis, Powdered Cimicifuga Root.

Dose.—Horses, 2 drs. to 1 or 2 ozs.; dogs, 5 grs. to 1 dr.;

Actions.—Is a good stomachic, anti-spasmodic, aphrodisiac. diaphoretic, diuretic and expectorant; stimulates heart similar to digitalis and acts like ergot on involuntary muscular fiber, but much feebler than either.

Uses.—Three or four drachms given to horses one-half hour before feeding acts as a powerful appetizer; use in cardiac diseases where digitalis would be dangerous; chorea, rheumatism, especially of the localized muscular variety, as lumbago or gen-

eral muscular soreness. It is prescribed with nux vomica for weakness of sexual organs.

Belladonna.—Deadly night shade. Parts used, leaves and roots of atropa belladonna.

Belladonnæ Foliæ—Belladonna Leaves.—One-half the strength of the root.

Dose of powdered leaves for horse, 2 to 4 drs.; 1 oz. is sometimes given; cattle, 4 drs. to 1½ ozs.; dogs, 2 to 5 grs.

Belladonnæ Radix—Belladonna Root.—Not used in crude form.

Emplastrum Belladonnæ—Belladonna Plaster.—Much used in human practice for lame back, etc.

Extractum Belladonnæ—Extract of Belladonna.

Dose.—Horse, 15 to 30 grs., if repeated not oftener than every four hours 30 to 60 grs. can be given; cattle, ½ to 2 drs.; dogs, 1-16 to 1 gr.; sheep, 1 to 15 grs.

Extractum Belladonnæ Alcoholicum—Alcoholic Extract of Belladonna Leaves.

Dose about the same as the extract, except dogs take 1-20 to ½ gr.

Extractum Belladonnæ Fluidum—Fluid Extract of Belladonna Root.

Dose.—Horse, ½ to 2 drs. can be given if not repeated more than once or twice, as in colic as an antispasmodic; cattle, 1 to 2 drs.; pigs, 2 to 10 ms.; sheep, 20 to 40 ms.; dogs, ¼ to 5 m,

Tinctura Belladonnæ—Tincture of Belladonna Leaves.

Dose.—Dogs, 2 to 20 ms.

The preparations most commonly used are the extract, powdered leaves, and fluid extract most of all. The root contains the greatest per cent of atropine.

Atropinæ Sulphas—Sulphate of Atropine.—A white crystalline powder, very soluble in water and alcohol; belladonna leaves contain .46 per cent and the root .60 per cent.

Dose.—Horse, ½ to 2 grs.; dogs, 1-150 to 1-30 gr.; 1-10 these doses for hypodermic use, or 1-10 gr. to ¼ gr. average hypodermic dose; ⅛ gr. for horse when used with morphine.

Composition.—The physiological activity depends on the alkaloids; atropine is found chiefly in the bark of the root, also contains belladonnine, an acid and coloring matter.

Antagonists and Incompatibles.—Caustic alkalies, antagonize physiologically, by pilocarpine and physostigma throughout almost the whole range of its influence, and opium within a certain limitation, prevents the respiratory failure, which is the cause of death.

Physiological Actions.—Irritant narcotic, mydriatic, antispasmodic and anodyne. Small doses are cardiac, respiratory and spinal stimulant; in large doses, paralyzer of the secretory and motor nerve endings and a stimulator of the entire sympathetic system; it produces dryness of the mucous membrane of the throat, mouth, nose and larynx, and at first lessens the gastric and intestinal secretions, but soon produces them in large quantities. It is an anti-galactogogue, that is, it arrests secretion of milk. The heart rate is at first slowed, but soon becomes very rapid and vigorous, the pulse being doubled in rapidity; arterial tension is raised and the circulation greatly increased; this is accomplished by stimulation of the cardiac sympathetic, and paralyzing the intracardiac inhibitory ganglia, thus stimulating the accelerator apparatus while lessening the inhibitory. (Digitalis increases both.) The vaso-motor ganglia all over the body are stimulated, but afterwards paralyzed by over-stimulation, the heart weakens, the vessels relax and the blood pressure is greatly lowered, complete motor paralysis follows, then delirium, stupor, and finally death, usually by asphyxia.

The pupils are dilated by the local or systemic use of the drug. It paralyzes accommodation and lessens intraocular pressure, the least amount of atropine affecting the pupil is stated by Donders to be the 1-700,000 of a grain.

The brain is congested by belladonna, a busy delirium being produced, and hallucinations with mental disorder, due to a selective action on the cells of the gray matter. In horses it greatly stimulates the motor apparatus, which afterwards becomes greatly exhausted.

The spinal cord is stimulated from the second cervical vertebræ to the tenth dorsal, resulting in paralysis of the motor nerves, both central and peripheral, power being lost in hind extremities first.

Sensation.—Is slightly impaired, but the muscular irritability is not.

Respiration is increased and the temperature is raised by the increased circulation; metamorphosis is greatly promoted.

A diffused eruption of scarlet color, greatly resembling scarlet fever is occasionally produced by belladonna on the skin and fauces, with dysphagia (inability to swallow) and sore throat; this is sometimes followed by desquamation, due to capillary congestion caused by greatly increased circulation.

Belladonna and Atropine are rapidly diffused and quickly eliminated, particularly by the kidneys. In poisoning give tannic acid and opium, keep the animal moving; by its paralyzing effect on the terminal nerve filaments, it relaxes the bronchial tubes and checks secretion of bronchial mucous membrane; it checks secretion of saliva and milk in the same way and causes dryness of the skin.

Medicinal Uses of Belladonna and Atropine.– Belladonna is indicated anywhere that an antispasmodic and anodyne is needed, is serviceable in catarrh, pharyngitis, laryngitis and bronchitis; heaves, especially asthmatic heaves, combined with lobelia, followed by Fowler's Solution; in influenza, it stimulates the weakened heart, besides having other good effects. In respiratory diseases, belladonna alone, or combined with aconite or other febrifuges and expectorants; in cough especially spasmodic or when due to irritation of the throat; in heart failure or heart weakness; hypodermic injections of atropine are beneficial; in spasmodic colic 1 to 2 drs. to a dose, but 1 dr. is usually sufficient; as a powerful antispasmodic and anodyne, atropine and morphine combined; small doses are given in constipation of the bowels, combined with nux vomica; small doses with purgatives are said to aid their action. In tetanus give 1 to 2 drs. of the extract 2 or 3 times daily; in paralysis of the throat of tetanus the fluid extract combined with soap liniment or used alone externally; in cerebro-spinal meningitis, belladonna and ergot alternated with aconite is rational treatment, conjoined with external treatment; it allays irritation of the bladder, rectum, and uterus, especially if combined with cannabis indica; in contraction or rigid os, the extract applied directly, quickly relaxes and allows of parturition; it is well to see if this is necessary before giving ergot. In mamitis it is very beneficial, checks secretion of milk and allays irritation; give 1 dr. of Fluid Extract Belladonna to ½ or 1 oz. Fluid Extract phytolacca 3 or 4 times daily, use the

same treatment locally. Belladonna and atropine are antidotes for poisoning by opium, physostigma, pilocarpine and anæsthetics.

IN EXAMINATIONS AND DISEASES OF THE EYE,

Atropine sulphate is used locally to dilate the pupil, assisting in the detection of cataracts or other disorders of the eye, and testing the condition of the refracting media; for dilating the pupil use a solution of 4 to 8 grs. to the 1 oz. of distilled water, a few drops are instilled into the eye; for inflammation of the eye with great irritation, belladonna may be combined with cocaine; in iritis, atropine or belladonna relieves congestion and prevents or breaks down adhesions between the iris and the capsule of the lens; in such cases it should be alternated with myotics, such as eserine; in rheumatism, belladonna conjoined with anti-rheumatics is very beneficial, also for muscular pains; in liniments 1 to 2 ozs. of Fluid Extract Belladonna to the pint is useful. Dr. Quitman recommends the following for an anoydne and stimulating liniment where there is great pain.

℞	Tr. acon. rad.,	℥ ii.
	Fl. ex. bellad..	℥ iss.
	Ol. Terebinth,	℥ ii.
	Linim. saponis,	℥ vi. or vii.
	Spts. vini rect. qs. ad..	Oj.

M. Sig.—Liniment. Apply 3 or 4 times daily.

The belladonna ointment combined with ointment of stramonium and ointment of tannic acid is very good for piles and irritating ulcers.

Fluid extract of belladonna is very useful combined with aconite and other proper drugs at the outset of nearly every inflammatory disease, acute inflammation of the air passages, such as pneumonia, bronchitis and pleurisy; at the outset of lymphangitis and acute laminitis; in congestion of any part, small doses frequently repeated dissipate the congestion and abort the resulting inflammatory action, congestion of liver, brain, kidneys, etc Useful in eye-washes for simple ophthalmia as well as the graver diseases of the eye, ½ oz. of the Fluid Extract to 1 pint of water. Very good for incontinence of urine due to irritation especially when combined with the Fluid Extract of cannabis indica and hyoscyamus; if due to paralysis of the sphincter, combine with strychnine or nux vomica, or alone in the opposite condition of spasm of urethra and bladder; atropine is the best treatment

for ptyalism (or salivation) from mercury, iodine or any other cause; it not only relieves it, but stimulates the heart against their depressing effects. In acute nasal catarrh with profuse watery discharges, belladonna is very efficient. In muscular cramps, commonly affecting hind legs of horses which stand still for some time, especially in cold barns; give large doses of belladonna internally, and apply stimulating liniments externally, as belladonna combined with Tr. of capsicum, Tr. of myrrh and soap liniment in equal parts.

STRAMONIUM—THORN APPLE.

STRAMONII FOLIA—STRAMONIUM LEAVES.

STRAMONII SEMEN—STRAMONIUM SEED.—All official preparations are made from the seeds.

Dose.—Horse, 15 grs. to 1½ drs.; dogs, ½ to 3 grs.; pigs, 2 to 6 grs. Doses of leaves and seed the same.

EXTRACTUM STRAMONII SEMINIS—EXTRACT OF STRAMONIUM SEEDS.

Dose.—Horse, 5 to 10 grs.; dog, ⅛ to ½ gr.; pig, ½ to 1 gr.

TINCTURA STRAMONII SEMINIS.

Dose.—dog, 2 to 30 ms.

EXTRACTUM STRAMONII SEMINIS FLUIDUM.

Dose.—Horse, 15 ms. to 1½ dr. but 2 drs. can be given. Cattle, ½ to 2 drs.; dogs, ½ to 5 ms.

UNGUENTUM STRAMONII.—Contains 10 per cent of the extract.

Composition.—Contains an alkaloid, daturine, with actions identical with atropine.

Physiological Actions.—Is like belladonna in almost every particular, but stramonium is more powerful and acts chiefly on the sympathetic system, not affecting the motor or sensory nerves; in large doses it causes a greater degree of cardiac irregularity and a more furious delirium; it has a special affinity for the generative organs, quieting the sexual passion; it dilates the bronchii in asthma, much more than does belladonna.

Uses.—To relieve pain, spasmodic affections, asthma or asthmatic heaves, spasmodic colic, nymphomania (unsatisfied or excessive sexual desire in the female.) In asthma in dogs or heaves in horses, combine it with gelsemium and lobelia and follow up with Fowler's Solution of arsenic; for irritable ulcers and

piles, combine ointments of belladonna and tannic acid with ointment of stramonium; useful in spasms of the sphincter vesica.

Antagonists, Incompatibles and Synergists. – Same as for belladonna.

Nitro-Glycerin—Trinitrin—Glonoin.—Is used in collapse, or heart failure, hypodermically in 1 per cent solution, not considered explosive at this strength unless heated.

Dose.—Human, internally, 1 to 2 drops; horse, hypodermically, ½ dr., 45 m. or 1 dr. can be given, but it is better to give from 20 to 30 ms. and repeat; it has a stimulating action on the heart and is the most powerful and quickest of all cardiac stimulants. It is kept in 1 per cent alcoholic solutions and in tablets and pills, containing 1-100 of a grain.

Hyoscyamus—Henbane.—Leaves and tops of hyoscyamus niger.

Extractum Hyoscyami Alcoholicum.

Dose.—Horse, 3 to 15 or 20 grs., but ½ to 1 dr. can be given. Dogs, 1-10 to 1 gr.

Extractum Hyoscyami Fluidum.

Dose.—Horse, 2 dr. to 1 oz.; dogs, 2 ms. to ½ dr.; cattle, 2 drs. to 1½ ozs.

Tinctura Hyoscyami.

Dose.—Dogs, 15 ms. to 1 dr.

Composition.—Contains an alkaloid, hyoscyamine, but is too expensive for veterinary use.

Physiological Actions.—Similar to belladonna and stramonium, but less powerful and less irritant, and the most calmative and hypnotic; it is more stimulating to the vaso-motor system and the cardiac accelerator apparatus than is stramonium, but less active upon the pneumogastric, its delirium in never furious, and is without congestion of the brain. To sum up the action of hyoscyamus, it is hypnotic, anodyne, antispasmodic, vaso-motor and cardiac accelerator and stimulant.

Uses.—It is principally used as a hypnotic and anodyne when opium is contra-indicated, it is used in delirium of azoturia, or to prevent delirium, combined with Fluid Extract of Gelsemium, for such cases full doses are given; it is a good anodyne to combine with cannabis indica in spasmodic colic; in constipation, combined with purgatives, it is said to aid their action and pre-

vent griping; it is used in irritable conditions of the kidneys and bladder; is eliminated by the kidneys.

AGENTS EXCITING THE FUNCTIONAL ACTIVITY OF THE CEREBRUM.

CEREBRAL EXCITANTS.—Drugs under this class are usually classed as antispasmodics.

CAMPHORA—CAMPHOR.—Occurs in colorless, translucent crystalline masses. Dose of gum camphor:

Horse, 1 to 2 drs.; sheep and pigs, 10 to 40 grs.; cattle, 2 to 4 drs.; dogs, ¼ to 10 grs. Is soluble 1 in 700 parts of water; 1 in 4 of olive-oil, readily soluble in ether, alcohol, chloroform and milk.

AQUA CAMPHORÆ.

Dose.—Dogs, ½ dr. to 1 oz.

LINIMENTUM CAMPHORÆ.—Is also known as oleum camphoratum. (It is composed of camphor 200 parts and cotton seed-oil 800 parts); it is a mild rubefacient; is used in cough mixtures, in from 2 or 3 drs. up to 1 oz. at a dose for a horse; also used locally in liniments.

LINIMENTUM SAPONIS—SOAP LINIMENT.—Composed of soap 10 parts, camphor 5 parts, oil of rosemary 1 part, alcohol 70 parts, water to make 100 parts; for external use only, as a mild, stimulating and anodyne liniment, but is usually combined with other drugs and used for its stimulating properties.

Stimulating anodyne liniment, for sprains and muscular soreness:

℞ Tr. acon. rad., ℥ iv.
Fl. ex. bellad. ℥ iv.
Linim. saponis., ℥ iv.
Spts. vini rectif., ℥ iv.
M. Sig.—Apply 3 or 4 times daily.

SPIRITUS CAMPHORÆ—SPIRITS OF CAMPHOR.—Composed of camphor 100 parts, alcohol to make 1000 parts. 10 per cent strength.

Dose.—Horses, 2 drs. to 1 oz.; two or three ozs. may be given; frequently prescribed in colic mixtures; cattle, ½ to 2 ozs., and up; dogs, 1 to 20 ms.

CAMPHOR MONOBROMATA—MONOBROMATED CAMPHOR.

Dose.—Dog, 1 to 10 grs.; human, 5 to 10 grs.

It is colorless, prismatic needles or scales, permanent in air,

almost insoluble in water, freely soluble in alcohol, ether, chloroform and mixed oils; used almost entirely as an anaphrodisiac.

Antagonists and Incompatibles.—The addition of water precipitates camphor from its alcoholic solution. Coffee, cold, and arterial sedatives antagonize its physiological action.

Synergists.—All remedies of this group, as alcohol, opium and narcotic substances, increase the effect of camphor.

Physiological Actions.—Antispasmodic or nerve stimulant, anodyne, antiseptic, diaphoretic, a stimulant expectorant, a cerebral excitant or narcotic, a gastro-intestinal irritant, a rubefacient or counter-irritant and also carminative. It has an acrid, hot taste, irritates the skin and mucous membrane, large doses causing gastro-intestinal inflammation.

Medicinal Doses.—Stimulates the vaso-motor system and the cardio-motor ganglia, and lessens the influence of the pneumogastric (inhibitory nerve); afterwards stimulates the accellator apparatus, thus increasing the circulation and raising arterial tension; it also stimulates respiration, and in man stimulates mental activity even to intoxication; large doses have a general depressing effect, and may cause death.

Elimination.—By the bronchial mucous membrane, skin and kidneys; (may cause dysuria).

Uses.—In catarrhal conditions, cough mixtures, chronic bronchitis. The spirits of camphor is used in colic mixtures; also locally to stop secretion of milk; in cardiac weakness; stranguary may be relieved by 1½ to 2 ozs. of the spirits for the horse. For colds, give quinine, camphor, carbonate of ammonia and opium.

The monobromate is used as an anaphrodisiac.

Asafœtida.—A gum resin of a very fœtid odor and nauseous taste.

Dose.—Horse, 2 to 4 drs.; cattle, ½ to 1 oz.; sheep, 1 dr.; dogs, 1 to 20 grs. Given in bolus, in ammonia solution, as an emulsion in water, or dissolved in alcohol.

Tinctura Asafœtidæ.

Dose.—Horse, 1 to 4 ozs.; dogs, 15 ms. to 2 drs.

Physiological Actions.—Antispasmodic, nerve and cerebral tonic and stimulant; stimulating expectorant, laxative, diuretic, diaphoretic, emmenogogue, aphrodisiac, anthelmintic, cardiac

and vaso-motor stimulant; stimulates secretion in general; long continued it deranges the stomach.

Uses.—Formerly much used in spasmodic and flatulent colic, but now seldom used; used in convulsions, bronchial affections, in chronic catarrh, combined with chloride of ammonnia.

AMMONIACUM—AMMONIAC.—Similar to but not as powerful as asafœtida; do not mistake ammoniacum for ammonia.

VALERIANA—VALERIAN.—Of no use in veterinary practice; has somewhat the same actions as asafœtida.

CANNABIS INDICA—INDIAN CANNABIS—INDIAN HEMP—EXTRACTUM CANNABIS INDICÆ—EXTRACT OF CANNABIS INDICA.—There is also a CANNABIS AMERICANUS; but the Indian cannabis is the one most used.

Dose of Extract.—Horse, ½ to 1 dr.; dogs, ⅛ to 2 grs.

EXTRACTUM CANNABIS INDICÆ FLUIDUM.—

Dose.—Horse, 2 drs. to 1 oz., in colic ½ oz. is the average dose. Dogs, 1 to 20 ms. Use Searle's and Hereth's preparation of Fluid Extract cannabis indica.

Antagonists and Incompatibles.—Caustic alkalies, acids and strychnine oppose its actions.

Synergist.—Alcohol, ether, belladonna, hyoscyamus, opium, etc.

Physiological Actions.—Antispasmodic, anodyne and narcotic; a cerebro-spinal stimulant and aphrodisiac; increases mental and motor activity, stimulates vaso-motor nerves, etc. and depresses sensation. Intoxication or complete and heavy sleep are caused by it according to the size of the dose, in animal as in man.

Uses.—Excellent in spasmodic colic. For spasmodic colic:

℞

Fl. ex. cannabis ind.,	ʒ j.
Fl. ex. hyoscyami,	ʒ j.
Tr. capsici,	ʒ ij.
Spts. ammon. arom..	ʒ ij.
Ac. salicylici	ʒ iij.

M. Sig.—Give one-half at a dose in a pint of water, and repeat in ½ or ¾ of an hour if necessary.

In tetanus use large doses. An Englishman claims to have cured 50 per cent of his cases with it; is an excellent sedative and anodyne to the urinary apparatus for dysuria and retention of urine, due to spasm of the sphincter.

Coca — Coca — The Leaves of Erythroxylon Coca — Extractum Cocæ Fluidum.

Dose.—Horse, 1 to 4 or 6 ozs.; dogs, 10 ms. to 2 drs. The action is due to the alkaloid cocaine, the salt of which is Cocainæ Hydrochloras; it occurs in colorless, transparent acicular crystals, or a white crystalline powder, without odor and slightly bitter taste; soluble 2 parts in 1 of water, and 1 in 2½ of alcohol; a grain or two of salicylic acid to the ounce of a solution preserves it.

Dose of the Cocainæ Hydrochloras.—Horse, 5 to 20 grs. ½ of this for hypodermic uses. Dogs, 1-16 to 1 gr.; not much used internally.

Physiological Actions.—In small doses it is a cerebral, cardiac, respiratory, and nervous stimulant and diuretic; overdoses cause delirium with cardiac and respiratory failure. Cocaine is a powerful local anæsthetic; used for horses in 4 to 10 per cent solution, usually a 4 to 6 per cent solution being strong enough for ordinary operations, inject under the skin, into the muscular tissue or over nerve trunks for small operations; applied to such structures as the eye, glans penis, schneiderian membrane, tongue or other delicate mucous surfaces, rectum, uterus, vagina, etc., it causes a profound but temporary anæsthetic over a small space; it causes rapid and extreme dilation of the pupil.

Antagonists.—Amyl nitrite or nitro-glycerin combats the cardiac depression; most direct antagonist is chloral; morphine, alcohol, opium and artificial respiration are also antagonistic.

Therapy.—Cocaine is injected for minor operations to prevent pain, such as neurectomy, removing tumors, operations on eyes, tongue, fistulæs, firing, etc. Rubbing on the skin is a failure; inject. For dogs it should be used with caution, a 2 per cent solution usually being enough, and as little as possible being used.

The oleate of mercury and oleate of cocaine (not official, 10 per cent strength) is useful for splint lameness, etc. Cocaine in salves is useful in painful eye disease, especially with citrine ointment, 1 or 2 grs. to the 1 dr., diluted with lard. The fluid extract of coca is useful as a stimulant and restorative in collapse, sun-stroke, etc. A 5 or 6 per cent solution of cocaine injected at the point of neurectomy is an aid to the diagnosis of foot lameness.

REMEDIES WHICH DIMINISH OR SUSPEND THE FUNCTIONS OF THE CEREBRUM AFTER A PRELIMINARY STAGE OF EXCITEMENT, OR CEREBRAL SEDATIVES.

ALCOHOL.—One can accomplish more with the judicious use of alcohol than with any other single drug in the pharmacopœia; in prescribing alcohol it is prescribed in full SPIRITUS VINI RECTIFICATUS, or abbreviated SPTS. VINI RECTIF., or as ALCOHOLIS.

ALCOHOL is a liquid composed of 91 per cent by weight or 94 per cent by volume of ETHYL ALCOHOL, and 9 per cent by weight, or 6 per cent by volume of water. This is referred to as alcohol.

Character.—A transparent, colorless and volatile liquid of a characteristic pungent and agreeable odor and burning taste; this is grain spirits; it is made from the distillation of fermented grain.

ALCOHOL DILUTUM—DILUTED ALCOHOL.—Contains 41 per cent by weight or 48.6 per cent by volume of absolute ethyl alcohol; this is about one-half the strength of full strength alcohol.

ALCOHOL ABSOLUTUM—ABSOLUTE ALCOHOL.—This should not contain more than 1 per cent of water by weight.

ALCOHOL AMYLICUM—AMYLIC ALCOHOL.—Known as FUSEL OIL; this is a peculiar alcohol obtained from fermented grain or potatoes, by continuing the process of distillation, after the ordinary spirit or true alcohol has ceased to come over; in other words, it is the result of excessive distillation.

Character.—It is an oily, nearly colorless liquid, having a strong, offensive or stifling odor, and an acrid burning taste; it should be used with great caution as it is a powerful general depressant, whether taken internally, applied locally, or by inhalation. Dr. Quitman recommends its use for one condition only, and that is to scatter around the barn and premises to kill chicken lice; it will kill a dog very quickly when applied locally to a very large surface.

SPIRITUS FRUMENTI—WHISKY.—Contains 44 to 50 per cent by weight, or 50 to 58 per cent by volume of alcohol, and is made by the distillation of fermented grain, and should be at least two years old.

SPIRITUS VINI GALLICI—BRANDY.—It is an alcoholic liquid

obtained by the distillation of fermented grapes; should be at least four years old. Its alcoholic strength is from 39 to 47 per cent by weight, or 45 to 55 per cent by volume. Brandy is the most astringent of all the alcoholic beverages on account of its containing tannic acid, and its continued use will cause constipation.

Physiological Actions of Alcohol.—It is a cerebral excitant, and finally becomes a depressant and a narcotic poison. It is anæsthetic, antiseptic, very good antiparasitic, rubefacient (if confined), mild astringent; a local refrigerant by virtue of its rapid evaporation, unless confined by bandage, oiled silk, etc., when it is absorbed by the tissues and causes a sensation of warmth. In medicinal doses it is a powerful general stimulant; it is very diffusible, and is partly oxidized by the organism, and partly excreted; thus alcohol acts as a food. Small doses relax the blood vessels, stimulate gastric glands, promote appetite and digestion, lessen the elimination of waste products, (urea and carbonic acid) by preventing rapid tissue waste, cause a feeling of warmth, and temporarily, though slightly, raise the temperament of the body; it stimulates the heart and increases the functional activity of all organs, especially the kidneys; large or too long continued doses derange the appetite and digestion, congest or inflame the stomach and liver. Eight ounces of alcohol killed a horse. Alcohol is poisonous and should be used with caution.

Uses.—Are numerous, used principally as a stimulant, either in one large dose, 3 or 4 ozs. of alcohol, or better, in small repeated dose, one ounce every 1, 2 or 3 hours; can be combined with other stimulants such as sulphuric ether, aromatic spirits of ammonia, digitalis, etc. It is used in anæsthetic mixture, such as alcohol, ether and chloroform, combined in different proportions; snake bites, blood poisoning; alcohol makes an excellent dressing for wounds; applied locally to threatened bed-sores, frequently prevents their formation. It is useful in colds at their outset, or in a chill to restore the balance of the circulation and prevent internal congestion by relaxing the blood vessels of the periphery. Useful in all debilitating diseases, such as influenza, in ½ to 1 or 2 ounces, in doses repeated every two or three hours. One-half to one drachm of quinine to one ounce of alcohol, for influenza or febrile diseases in general, excepting

brain and spinal diseases; useful in convalescence; in colic can be used with a great degree of success; it will act as a carminative antispasmodic and stimulant, used in collapse and in weak heart; in septicæmia and pyæmia it has notable antiseptic and antipyretic effects; the effects of alcohol are noticed in ten or fifteen minutes after administration and will be shown by a better condition of the pulse, the weak pulse becomes stronger and firmer; the quick pulse slower, the breathing becomes more natural, eyes brighten up, and in fact a general improvement.

Externally.—Alcohol is used alone as a strengthening application to weak tendons and muscles, or after a race, is used to rub on the legs, combined with other drugs as a liniment, as alcohol, soap-liniment and witch-hazel; can be used in surgery as an antiseptic.

Dose.—Horse, 1 to 2 ozs.; cattle, 1 to 3 ozs.; sheep, ½ oz., dogs, 10 ms. to 1 dr.

Whisky, gin and brandy, from 2 to 4 times as much, they being about ½ the strength of alcohol; alcohol should be diluted with 4 to 6 times its bulk of water, and whisky twice its bulk of water.

ÆTHER—ETHER.—A liquid composed of 74 per cent of ethyl oxide and about 26 per cent of alcohol with a little water; made by the distillation of stronger alcohol and sulphuric acid, this is ETHYLIC ETHER, commonly known as SULPHURIC ETHER.

Dose of sulphuric ether.—Cattle, 2 to 3 ozs.; dogs, 15 ms. to 1 dr.; horse, 1 to 2 ozs.; sheep and pigs, 2 to 4 drs. These doses are as stimulants or antispasmodics, etc. It is advisable to mix it with alcohol to render it more soluble, diluted in 8 or 10 times its bulk of water, as sulphuric ether 1 oz., alcohol 1 oz. and water ¾ pint, as a diffusible stimulant.

ÆTHER FORTIOR—STRONGER ETHER.—A liquid composed of 94 per cent of ethyl oxide and about 6 per cent of alcohol containing a little water; this is the one used for anæsthetic purposes and Squibbs' ether is the best. It is a thin, very diffusive, clear, colorless liquid, of a refreshing characteristic odor, a burning sweetish taste with a slight bitter after taste and neutral reaction; it is soluble in all proportions in alcohol, chloroform, benzol, benzine, fixed and volatile oils, and it dissolves in 8 times its volume of water at 60° F. Ether is highly inflammable, and its

vapor when mixed with air and ignited, explodes violently; as an anæsthetic, horses and cattle require from 4 to 16 ozs. Smaller animals from 4 drs. to 1 or 2 ozs. Chloroform is usually prescribed for large animals and ether for smaller animals. Ether never paralyzes a healthy heart, while chloroform some times does.

Spiritus Ætheris—Spirit of Ether.—Consists of 30 parts ether and 70 parts alcohol. Dose about the same as sulphuric ether, used as a stimulant and antispasmodic.

Spiritus Ætheris Compositus—Compound Spirits of Ether.—Well known as Hoffman's Anodyne, composed of stronger ether 30 parts, alcohol 67 parts, ethereal oil 3 parts.

Dose about the same as sulphuric ether.

Spiritus Ætheris Nitrosi—Spirits of Nitrous Ether—Common name, Sweet Spirits of Nitre.—An alcoholic solution of ethyl nitrate; it is a volatile, inflammable liquid of a pale yellowish color, a fragrant ethereal odor and sharp burning taste, containing 5 per cent of crude ether; should not be kept on hand too long as it becomes strongly acid with age. It is used as a general stimulant, a febrifuge, antispasmodic, diaphoretic, diuretic, and carminative; large doses are narcotic.

Doses as a stimulant and antispasmodic. Horse, 1 to 3 ozs.; sheep, 2 to 4 drs.; dogs, 15 ms. to 1 dr.; cattle, 1 to 4 ozs.; pigs, 1 to 2 drs. As a diuretic and febrifuge horses take from ½ to 1 oz. ½ oz. is sufficient as a rule, every 2, 3 or 4 hours, usually combined with other drugs for all of its purposes, in fever and colic cases.

Æther Aceticus—Acetic Ether—This is an Acetate of Ethyl.—A colorless liquid, of a strong fragrant ethereal odor. Dose about the same as sulphuric ether; used as a stimulant, antispasmodic and carminative, it is like sulphuric ether but has a pleasanter taste, often preferred in human practice on that account.

There is also an Ethyl Bromide or Hydrobromic Ether.—Acts quicker than sulphuric ether, and is occasionally used in brief operations.

Antagonists and Incompatibles.—Ether dissolves iodine, bromine, corrosive sublimate, the volatile and fixed oils, many resins and balsams, tannin, most of the alkaloids, sulphur and phosphorus; the last two but sparingly; as respects its stimulat-

ing and anodyne properties, it is antagonized by arterial sedatives, quinine, strychnine, picrotoxin, etc.

Synergists.—Alcohol and its congeners, chloroform, arterial stimulants, cerebral stimulants, etc.

Physiological Actions.—Ether is anodyne, antispasmodic, diaphoretic, anthelmintic; a cardiac, respiratory and cerebral stimulant, an anæsthetic and a narcotic poison; one of the best and quickest acting, diffusible, general stimulants, acting on the heart reflexly from the stomach. It is a powerful secretory stimulant, acting especially on the secretions of the stomach, salivary glands, and pancreas. On the cerebrum and the motor and sensory nerves, its actions are similar to that of alcohol, but more prompt and less protracted; it is eliminated quickly, chiefly by the lungs. When inhaled, it first causes irritation of fauces, a sense of strangulation and cough, then a stage of excitement, (cerebral intoxication) in which the visible mucous membranes are flushed and the respiration and pulse quickened; a convulsive stage sometimes follows, with rigid muscles and respiration stertorous; this subsides and complete insensibility is established, the muscles being relaxed and the reflexes abolished; in fact all of the functions of the body are suspended, except respiration and circulation; if the inhalation be continued these too become paralyzed, death usually resulting from slow paralysis of respiration; (chloroform paralyzes quickly) the heart pulsating long after breathing has ceased. Atropine hypodermically is the best antagonist to the toxic effects of ether, also artificial respiration and injections of brandy.

Medicinal Uses of Ether.—When mixed with alcohol, as in the spirit, ether mixes readily with water. It is excellent in indigestion with flatulence; it checks gastric fermentation, expels the gas and overcomes irregular and violent gastro-intestinal movements; hence, is also very good in spasmodic colic. In spasmodic colic, best to combine with cannabis indica or belladonna.

In sleepy staggers it may be injected hypodermically; used also to dislodge worms in the rectum. A most reliable remedy in collapse. Ether and alcohol are indicated in parturient apoplexy; sulphuric ether with aq. ammonia or arom. spts. of ammonia, may be used intra-venously when the cow is unable to swallow. Sulphuric ether and alcohol or whisky are also good in

parturient eclampsia of bitches, alternated with arom. spts. of ammonia; for chills, spts. of nitrous ether; also useful in convalescence from debilitating diseases. Ether may be used for local anæsthesia, applied as a spray, from an atomizer, about 1 oz. usually being enough for the painless opening of abscesses or fistulæ, but cocaine is better in our animals. Sulphuric ether combined with opium prevents drying up effects of opium. Ether is used in syncope and asthma. As an anæsthetic it should be used in preference to chloroform, for the smaller and young animals, especially dogs, which are easily killed by chloroform. Ether is less prompt in action but much safer than chloroform, as it never paralyzes a healthy heart; it should be inhaled in as concentrated a form as possible, very little air being allowed, so it will exert its effects quickly; in dogs it acts in from 2 to 8 or 10 minutes according to the struggles of the dog; a light or fire of any kind should not be allowed near, as ether is very inflammable and its vapors explosive. For anæsthetic purposes use Squibbs' ether. Always have a bottle of aq. ammonia at hand as a rouser.

Chloroformum — Chloroform.—A liquid containing 99 per cent by weight of absolute chloroform, and not more than 1 per cent of alcohol. It is a heavy, clear, colorless, diffusive liquid, of characteristic pleasant ethereal odor, a burning, sweet taste, and a neutral reaction; its specific gravity is twice that of ether, soluble in about 200 parts of water, in all proportions of alcohol or ether, also in benzol, benzine, fixed and volatile oils.

Dose as stimulant, anodyne and antispasmodic.—Horses or cattle, 1 to 2 drs.; sheep or swine, 20 to 40 ms.; dogs, 2 to 10 ms. Should be well diluted with syrup, mucilage, eggs or diluted alcohol; repeat every two or three hours.

For Anæsthesia.—If the animal can be thoroughly confined and a proper inhaler used, one or two ounces for horses is enough to produce anæsthesia, but always have a large amount on hand to maintain the anæsthetic condition; sheep and pigs, ½ to 1 oz.

In administering chloroform admit a large quantity of air (about 10 volumes).

Preparations.—Aqua Chloroformi. – Dose – Dogs, 2 drs. to 2 ozs.

Emulsum Chloroformi.—Dose—Dogs, ½ dr. to 1 oz.

SPIRITUS CHLOROFORMI.—Dose—Horses, 1 oz.; cattle, 2 ozs.; sheep and pigs, 2 to 6 drs.; dogs, ½ to 2 drs. Well diluted.

LINIMENTUM CHLOROFORMI.—Composed of chloroform 30 and soap liniment 70 parts. For external use.

These should be well diluted except the aqua chloroform. They are used as stimulants, antispasmodics and anodynes.

Physiological Actions.—It is a topical irritant, antiseptic, parasiticide, carminative, antispasmodic and analgesic, full doses quickly and powerfully paralyze the cerebro-spinal nervous system; kills by paralyzing the heart and respiration; the latter effects are most rapidly produced when the drug is inhaled. Chloroform is the anæsthetic most used for veterinary purposes, except for dogs.

Locally it is rubefacient if confined or even suppurant; it also acts as a refrigerant, anodyne and local anæsthetic if not confined.

COMPARED TO ETHER. Chloroform is much more irritating to the mucous membrane, and causes violent gastro-enteritis, if swallowed undiluted it is less stimulating and more depressing to the heart and circulation; FOR INHALATION it requires much more air; is less irritant to the air passages than ether; is uninflammable, more pleasant, more prompt in action, has a shorter stage of excitement, causes a more profound narcosis, and is not so nauseating as ether. Statistics in human practice show it to be five times more fatal than ether.

The results of exhaustive experiments show that chloroform and ether both act in the same manner upon the heart and respiration, paralyzing the latter first, but chloroform acts much more quickly and powerfully than ether in both directions.

Uses.—It may be used as an aid in painful and prolonged parturition, where you have a tumultuous contraction of the uterus, or rigid contraction of the Os. Use only enough by inhalation to dull the pain and relax the parts; it will aid you in your efforts to rectify false presentations by relaxing the parts.

Internally.—Is used for its carminative, antispasmodic and anodyne effects; spasmodic coughs, chloroform combined with belladonna and opium, given in linseed gruel or water, well diluted; in liniments about one or two ounces to the pint, or chloroform 1 oz., turpentine 1 oz., soap liniment 2 ozs., is used as a counter-irritant; chloroform is used in chronic diarrhœa

with other drugs, such as morphine, capsicum, ether and oil of peppermint.

Directions for Anæthesia.—For dogs make a cone of a towel and paper, put a sponge in the bottom, allowing a small opening in the end to admit air, pour in ether a little at a time. For horses use an ordinary nose-bag or regular inhaler. Dr. Quitman recommends casting the horse; after complete anæsthesia remove the hopples; in brain disease or tumor of the brain chloroform would be dangerous. Horses with emphysema or heaves should not take chloroform; it is also dangerous in fatty degeneration of the heart. Operations during incomplete anæsthesia are dangerous; always produce complete anæsthesia, have the stomach empty, but don't fast animals. A hypodermic injection of morphine in full doses renders anæsthesia easier and less dangerous. Always watch the tongue, respiration, reflex action of eye, heart, etc.

REMEMBER,

1. The operator must be skilled and give his attention exclusively to the production of narcosis.

2. Watch the respiration and pulse for signs of failure.

3. Don't commence operation until the anæsthesia is profound, until reflex action is abolished, which can be told by touching the eye with finger, as the stimulus of the knife may reflexly stop the heart; obey this, no matter how slight the operation.

4. Great care should be exercised if the patient is very old or has fatty degeneration of the heart, or lung disease.

5. In operations about the mouth or trachea, see that no blood goes down the trachea; have stomach empty. This will cause less nausea and feed may be regurgitated and run down the trachea.

6. Use ether fortior, stronger ether; or chloroformum purificatum, purified chloroform; use Squibbs' make of both, as the agents must be pure.

7. Ether can be used almost pure, only a little air being necessarily allowed for dilution; chloroform must have a large amount of air.

8. The head should be slightly raised, and watch the tongue so that it does not fall back over the larynx and suffocate the animal.

9. Maintain no cramped or awkward position; and use no bindings when possible to avoid. If bindings are used remove as soon as the animal is unconscious.

10. Keep a clear head and a steady nerve, have on hand a good working hypodermic syringe; brandy or nitro-glycerin and aq. ammonia fort. should be kept in readiness; if breathing becomes very weak or stops, artificial respiration should be commenced AT ONCE and tongue pulled well forward to allow free entrance of air, strike the body sharply with cloths or hands to stimulate circulation. Brandy or atropine may be injected hypodermically and the ammonia inhaled; maintain warmth and try dilation of the anus, as recommended in human practice.

CHLORAL.

HYDRATE OF CHLORAL—CHLORAL HYDRATE.—Occurs in separate rhomboidal, colorless and transparent crystals, slowly evaporating when exposed to the air, having an aromatic, penetrating and slightly acrid odor, bitter, caustic taste and neutral reaction, freely soluble in alcohol, water or ether, also in fixed and volatile oils; it liquifies when mixed with carbolic acid and camphor. A solution of chloral hydrate should not be kept on hand long as it is transformed into chloroform; it should always be administered well diluted.

Dose.—Horses, 4 to 8 drs., up to 2 ozs., according to effect desired; cattle, ½ to 2 ozs.; pigs, ½ to 1 dr.; sheep, 1 to 2 drs.; dogs, 3 to 20 grs.

Antagonists and Incompatibles.—Alcohol, ammonia, atropine and other stimulants, to combat its depression on the heart and respiration; strychnine is also antagonistic; all alkaline agents decompose it into chloroform.

Synergists.—Are the hypnotic drugs, notably opium and the anæsthetics; these deepen the effect of chloral when used at the same time.

Physiological Actions.—Locally it is an irritant, antiseptic and stimulant; when absorbed it has a primary stimulating effect and a secondary sedative action on the circulation and central nervous system. Toxic doses after slight and temporary stimulation, notably depress and paralyze the cerebro-spinal centers.

Medicinal Doses.—Are hypnotic, analgesic, feebly anæsthetic, antispasmodic, and prevents coagulation of fibrin; it is more

hypnotic than chloroform and less anæsthetic; used hypodermically it produces extensive sloughing of tissues; large doses and strong solutions may cause gastritis; on the brain it produces anæmia; moderate doses contract the pupils, dangerous doses dilate them. Should be dissolved in eight or ten times its bulk of water.

Uses.—To quiet irritability, and cause sleep; can be combined with morphine for gastro-intestinal irritation and spasm, but should not be used where there is inflammation or a tendency to it. In violent spasmodic coughing, chorea, epilepsy and hysteria, to quiet. In tetanus continue large doses; it is the direct antidote to strychnine poisoning. Is used in phrenitis. Should not be used as an anæsthetic; is dangerous to inject into jugular, but is used that way by some practitioners in from 3 to 6 dram doses, dissolved in distilled water. As a hypnotic it may be combined with potassium bromide; this is especially useful in dog practice in all forms of fits.

Butyl Chloral Hydrate—or Croton Chloral Hydrate.—Resembles chloral but is less powerful, less cardiac depressant, is used more especially for neuralgia of the facial nerve in the human, in doses of 2 to 15 grs.

OPIUM.

The concrete milky exudation obtained in Asia Minor from the unripe capsule of Papaver Somniferum or Poppy Plant by incision and spontaneous evaporation.

Opium should yield at least 9 per cent of morphine by the process of assay in its normal moist condition.

PREPARATIONS OF OPIUM.

Opii Pulvis—Powdered Opium—This is opium dried and powdered and should not contain less than 12 per cent nor more than 16 per cent morphine.

Dose.—Horses, 20 to 60 grs.; sheep, 5 to 20 grs.; dogs, 1-20 to 3 grs.; cattle, 1 to 2 drs.; pigs, 3 to 10 grs.

Extractum Opii—Extract of Opium.—Has 18 per cent of morphine. Dose about ⅓ less than the powdered opium.

Pulvis Ipecacuanhæ et Opii.—This is the well-known Dover's Powder, 10 grs. contain 1 gr. each of ipecac and opium, and 8 grs. sugar of milk.

Dose as a diaphoretic and expectorant. Horse, 1 to 4 drs.; sheep, 30 to 60 grs.; dogs, 2 to 10 or 15 grs. repeated several times daily; supply patient freely with diluents, as water, and keep warmly clothed; from 5 to 15 grs. is frequently taken by man at the outset of colds to break them up.

TINCTURA OPII—TINCTURE OF OPIUM—LAUDANUM.

Opium strength 10 per cent, 13 minims or 25 drops equal 1 gr. of opium.

Dose.—Horse, ½ to 2 or 3 ozs.; cattle, 1 to 3 ozs.; sheep and pigs, 1 to 4 drs.; dogs, 2 to 30 ms.

TINCTURA OPII CAMPHORATA—CAMPHORATED TR. OF OPIUM—Well-known PAREGORIC.—½ oz. contains nearly 1 gr. of opium about 1-20 strength of the tincture.

Dose.—Puppies, 1 to 10 ms.; adult dogs, 10 ms. to 1 or 2 drs., up to ½ oz.

EMPLASTRUM OPII—PLASTER OF OPIUM. Not used in veterinary practice.

PILULÆ OPII, PILLS OF OPIUM.—Each pill contains 1 gr. of opium.

ACETUM OPII—VINEGAR OF OPIUM.—Same dose as the tincture.

VINUM OPII—WINE OF OPIUM.—Contains opium, cloves, cinnamon and sherry wine. Dose, same as the tincture; good for dogs.

TINCTURA OPII DEODORATI.—All about 10 per cent strength, and dose the same as the tincture.

Composition of Opium.—About ½ the weight of opium is made up of non-medicinal substance as gum, albumen, fragrance of the poppy capsules, sugar, resin, extractive matters, odorous principles, etc. It contains 17 or 18 so called alkaloids, besides 2 recognized neutral substances and 2 organic acids, etc.

The two principal alkaloids of opium are MORPHINE AND CODEINE. MORPHINE is hypnotic, anodyne and narcotic. CODEINE is more calmative and less constipating. There is also an important derivative of morphine obtained by the action of hydrochloric acid, known as APOMORPHINE.—It is an artificial alkaloid and a powerful emetic. The hydrochlorate is official.

Dose of APOMORPHINÆ HYDROCHLORAS as an emetic for dogs, ⅛ to 1-5 gr. by the mouth, and 1-20 to 1-10 grs. hypodermically; it is soluble 1 in 7 of water, it occurs in small gray

ish white shining needles, turning green on exposure to light and air, but this does not affect its action.

Of morphine there is an ACETATE, a HYDROCHLORATE and a SULPHATE. If you combine with zinc sulphate, use the sulphate of morphine, if combined with acetate of lead, use the acetate of morphine, etc.

MORPHINÆ SULPHAS.—Occurs in feathery crystals, soluble in 21 parts of water and ¾ of boiling water; contains about 80 per cent of morphine and is the form most used.

Doses.—Horses 2 to 10 grs. by the mouth; hypodermically for full sized horses, 4, 5 or 6 grs, but 4 grs. is generally sufficient and not apt to constipate; cattle, 5 to 10 grs.; pigs, 1-10 to ½ gr.; sheep, ½ to 2 grs.; dogs, 1-30 to ¼ gr. About one-half of these doses for hypodermic uses.

CODEINA—CODEINE.—This occurs in white or yellowish white prisms, soluble in 80 parts water at 60° F. and in 17 parts boiling water.

There is a PHOSPHATE OF CODEINÆ which is sufficiently soluble for hypodermic use, 1 in 20 of water usual solution.

Dose of Codeinæ about three times that of morphine; dogs, ¼ to 2 grs.

Antagonists and Incompatibles.—As regards chemical antagonism, the alkaline carbonates, lime-water, and salts of iron, lead, copper, zinc, mercury, and Fowler's Solution are incompatible with the preparations of opium; notwithstanding this chemical incompatibility, the metallic salts are frequently given in conjunction with opium and the systemic effects of both are produced; astringent vegetables (tannin) are also incompatible; they limit physiological activity by forming tannate of morphine, which is not readily soluble.

In Case of Poisoning.—Emetics, stomach pump, permanganate of potash, grain for grain of morphine. Artificial respiration, striking the body, keep moving, empty bladder to prevent reabsorption. Morphine can be detected in the urine; three very small doses of atropia sulphate administered 15 minutes apart may be given to act as a physiological antidote; give about 1-10 to ⅛ of a grain to a horse, if small horse, make the dose smaller; dogs, 1-120 gr. Strong coffee is a good antidote.

Synergists.—The cerebral and hypnotic effects are promoted by alcohol and its derivatives (notably chloral), and within cer-

tain limits by the mydriatics, its sudorific action is increased by ipecacuanha.

Physiological Actions.—Opium is analgesic, hypnotic, diaphoretic, antispasmodic, narcotic; also cardiac and respiratory depressant, after primary brief stimulation.

In Medium Doses.—It dries all the secretions, except those of mammæ and skin. The latter being increased, produces dryness of the mouth and throat, arrests gastric secretions, retards digestion, and causes anorexia (loss of appetite); it stimulates the brain by increasing the blood supply; in man it stimulates the mental activity, while in animals it stimulates motor activity; it does not affect the conductivity of nerves, but it prevents the consciousness of pain by paralyzing the nerve centers; the action of the heart is increased and arterial tension is raised, the pupil slightly contracted; the mind at first stimulated, becomes calm, sleep follows, disturbed by dreams and headache; constipation and some depression result.

In Full Doses.—It arrests digestion, causes nausea and vomiting (in animals capable of emesis) greatly increases the sweat, prevents the conductivity of nerves, depresses the heart and circulation, impairing oxidation and lowering temperature, it contracts the pupil by stimulating the motor oculi and causes intense pruritus (itching), especially of the nose, often retention of urine, and soon profound sleep; in some cases coma or delirium, leaving as after effects, nausea, depression, constipation, vertigo, anorexia, nasal pruritus, and fetid pathological secretions.

A Toxic Dose.—Produces cold clammy sweat, very slow heart, diminished quantity of urine, abolished reflexes, coma, the pupil minutely contracted, spoken of as pin point pupil by physicians, but dilated as the end approaches and death by suspension of respiration due to direct action of the poison on the respiratory centers in the medulla.

Post-Mortem—Shows no characteristic lesions, find wet brain, congested lungs, and engorgement of the venous trunks and right side of heart.

Morphine and Codeine as compared with the action of opium; that of morphine is more anodyne and hypnotic; it causes more intense pruritus, is less stimulant, less convulsant, less constipating and less diaphoretic. Codeine is a motor paralyzant; it exalts the spinal cord more than morphine and affects the cerebrum less,

producing muscular tremors in excess of sedation; it reduces the urinary sugar in diabetes and has a selective sedative influence on the pneumogastric.

Therapy.—The chief indications for the use of opium are:

1. To relieve pain.
2. To produce sleep.
3. To allay irritation.
4. To check excessive secretion.
5. To support the system.
6. As a sudorific.

Sulphuric ether prevents its drying up effects as well as the nauseating and depressing effects. Used for pain from any cause except acute inflammation of brain. Used in low fevers to support system when sufficient food cannot be taken, also in irritation of bronchi, bladder, stomach and bowels, as well as the uterus.

In Peritonitis opium used freely or combined or alternated with aconite is very good.

In Pleurisy, at the outset, opium and aconite will often abort it.

In Diarrhœa—Dysentery, opium is one of the best drugs we have, or can combine opium with lead acetate, prepared chalk, etc.

In Enteritis.—Dr. Quitman doesn't believe in binding up the bowels with opium, but uses belladonna to reduce congestion in preference to opium, alternated with Tr. Aconite.

In Colds give Dover's Powder or opium, quinine, ammon. carb. and camphor. Dr. Quitman says, do not use opium in spasmodic colic, unless exceedingly painful, but give hypodermically four grains of morphine; he prefers non-constipating anodynes, such as cannabis indica, hyoscyamus, etc.

In Muscular Spasms opium is very efficient.

In Serous Inflammation in early stages, before effusion takes place.

In Cerebro-Spinal Meningitis, opium should be given early, before exudation has set in, with belladonna and ergot alternated with aconite.

In Diabetes Mellitus, codeine is said to be the best, as it lessens the amount of sugar in the urine, and should be admin-

istered by the mouth; if given hypodermically it exerts no influence on the sugar.

In Dyspnœa.—Use morphine, especially if from cardiac disease.

In Gastritis.—Opium combined with Bismuth Sub. Nitrate and Hydrastis.

In Eversion of Rectum or Uterus.—Give morphine hypodermically to prevent straining.

Opium or its Alkaloids are Contraindicated in diseases of the respiratory organs, with shallow embarrassed breathing, as they may still further depress and cause death; except in pleurisy, larger or more frequent doses may be given than in bronchitis or pneumonia, also contraindicated in acute fevers, congestion, and inflammation of brain and constipation.

In Coughs, opium combined with belladonna is very useful in small medicinal doses; as large doses antagonize each other. (Belladonna stimulates and opium depresses in full doses.)

For coughs in horses (12 doses):

℞

F. E. Bellad.,	ʒ i.
F. E. Lobelia,	ʒ iii.
Ac. Hydrocyan Dil.,	ʒ i. to iss.
Ol. Picis. liq.,	ʒ i.
Ol. Camph.,	ʒ iii.
Syr. Simplex Qs. Ad.,	℥ xii.

M. Sig.—One ounce every 2 or 3 hours.

If cough does not yield, you can combine morphine 1 to 2 grs. to the dose in place of hydrocyanic acid, or add to above formula. Grade the doses according to the frequency of administration.

In Catarrhal Diseases, give opium to lessen the discharge. Opium combined with belladonna for asthma in dogs, and in premature labor pains, either opium or morphine is useful.

It is used externally as an anodyne for any purpose, especially on wounds or abraided surfaces; has little if any action on unbroken skin. The uterus, vagina or rectum when everted should be washed with tepid water, then bathed with a solution of opium and belladonna, returned and retained by appropriate measures.

For inflammation of the eyes:

℞

Morph. sulphatis,	grs. iv.
Zinci sulphatis.	grs. ii.
Aq. distil.,	℥ i.

M. Sig.—Use as a lotion.

Tolerance of opium or morphine is said to be as quickly acquired in animals as in man; frequent or continued use as well as very acute pain calls for larger doses. In young animals it should be used with caution and in small doses.

BROMIDES.

Potassii Bromidum—Potassium Bromide.—Occurs in colorless, cubical crystals, soluble in 1.6 of water and 200 of alcohol; it is the most irritant to the stomach, of the bromides, most toxic to the heart and muscular system, quite a powerful depressant and least hypnotic; it contains 66 per cent of bromine, and is the one most commonly used in veterinary practice.

Dose.—Horses and cattle, ½ to 1 or 2 ozs.; dogs, 5 to 60 grs.; average dose 20 to 30 grs. Always dissolve in warm water when administering; the powder otherwise would exert but little action.

Sodii Bromidum—Bromide of Soda.—This does not irritate the stomach; good in dog practice; occurs in colorless monoclynic crystals, soluble in 1.2 of water and 13 of alcohol, and is neutral in reaction; it is the least toxic but most hypnotic, and acts most energetically on the circulation. It contains 78 per cent of bromine.

Dose, the same as for Bromide of Potash.

Lithii Bromidum—Bromide of Lithium.—A white granular deliquescent salt, very soluble in water and alcohol, contains the most bromine of the class, 92 per cent, and resembles the sodium salts in action, and is better than the others in epilepsy and is considered the best hypnotic of the series; also used a great deal in retention where the kidneys are at fault.

Dose.—Horse, ½ to 1 oz.; dogs, 2 to 20 or 30 grs. Good drug in rheumatism of dogs.

Ammonii Bromidum.—Occurs in colorless, prismatic crystals, soluble in 1½ of water, and in 30 of alcohol. It resembles the potassium salt in action, except that it exerts less influence on the heart and muscular system, and is somewhat more stimulating. It irritates the stomach.

Dose the same as Bromide of Lithium.

There is also a Calcium Bromide. Same dose as the bromide of soda and potash.

A Strontium Bromide, dose about the same, or smaller,

than the bromides of lithium and ammonium; also a ZINC BROMIDE which is a violent irritant in large doses; both used in epileptic conditions.

ACIDUM HYDROBROMICUM DILUTUM.—Contains 10 per cent absolute hydrobromic acid; used as a substitute for the bromides.

For Cerebral engorgement in dogs:

℞ Ac. hydrobrom dil., ℥ vj,
Fl. Ex., ergot, ℥ ss.
Syr. aurantii cortex, qs. ad., ℥ iv.
M. Sig.—One drachm 4 or 5 times daily in water.

Dose—Dogs, 5 ms. to 2 drs., well diluted.

Antagonists and Incompatibles.—Acids, acidulous and metallic salts are incompatible with bromides of ammon. and potash, and nitrous ether with the former; physiological actions are antagonized by cold, digitalis, belladonna, ergot and other agents which energize the vaso-motor nervous system.

Synergists.—Opium, chloral and other remedies of this group, promote the actions of the bromides on the brain, and aconite, veratrum viride, gelsemium, etc., increase the depressing effects of them on the circulatory system.

Physiological Actions.—They are pre-eminently depressants of the cerebral and spinal functions, also alterative, antispasmodic, hypnotic, and anaphrodisiac. The bromide of potash like all other potassium salts is especially a cardiac and muscular paralyzant, they are very diffusible and slowly eliminated; long continued doses produce gastric catarrh; they reduce the number of respirations and the heart's action and force; lessen activity of brain cells, producing sleep; diminish sensibility of peripheral nerves, causing anæsthesia of skin and mucous membrane. The continuance of full doses causes a form of chronic poisoning termed BROMISM, characterized by depression of cerebral faculties, increased secretion from mucous glands, feebleness, anæmia and wasting, lessened sexual function, dilated pupil, acne or eczematous eruption. Toxic doses kill by asphyxia, also cause fetid breath, relaxation of sphincters, etc.

Uses.—They are used as sedatives to the nervous system, to lower reflex activity, to produce sleep, to subdue excitement of the genital apparatus and to antagonize congestion of the brain, as the bromides bring about an anæmic condition of the brain; used in fits, particularly of dogs, 20 or 30 gr. doses of the bro-

mide of potash or bromide of soda dissolved in a little warm water; also bathe the head with cold water, repeat every 15 or 20 minutes, but one dose is usually sufficient; used in any convulsive or spasmodic conditions; used in tetanus but are of little value; for this, the bromide of potash is used in 2 oz. doses every 4 hours.

In acute rheumatism, BROMIDE OF AMMON. OR BROMIDE OF LITHIUM are both quite serviceable in dog practice.

IN NYMPHOMANIA, the bromides are the best treatment.

In strychnine poisoning, the bromide of potash may be used as an antidote in place of chloral.

GELSEMIUM—YELLOW JASMINE.

EXTRACTUM GELSEMII FLUIDUM.—That made from the green root is the best.

Dose.—Horse, 1 dr. to ½ oz. up to 1 oz. for a single dose. Dog, 1 to 10 or 20 ms.

TINCTURA GELSEMII—TINCTURE OF GELSEMIUM.

Dose.—Dogs, 1 to 30 ms.

Composition.—Contains gelsemine, a very powerful alkaloid, also an acrid resin, volatile oil, gallic acid, coloring matter, etc.

Antagonists and Incompatibles.—Caustic alkalies and tannic acid are chemically incompatible; physiologically, by general stimulants and other special stimulants. Toxic effects are treated by emetics, warmth, alcoholic stimulants, artificial respiration, and morphine subcutaneously.

Synergists.—Conium, physostigma, tobacco, opium, etc., increase its effects when administered along with it.

Physiological Actions.—A splendid nerve sedative, antispasmodic and nerve depressant, paralyzing motility and sensibility by central action on the spinal cord. It lowers body temperature; is not irritating; effects of moderate doses pass off in about 3 hours.

Toxic Doses cause vertigo, drooping of eyelids, dilated pupils, labored breathing and feeble heart, drooping jaw, staggering gait, great muscular weakness, general anæsthesia, sweats and death by asphyxia due to paralysis of muscles of respiration.

Uses.—Is a very useful drug in exalted nerve function or in

any condition known as nervous excitability; contraindicated when there is a weak heart.

In Azoturia, gelsemium is the best drug to prevent or control its delirium; start in with 2 dr. doses, when given every 2 or 3 hours, if the animal is quite excited give ½ oz. dose, and combine it with Fl. Ex. hyoscyamus ½ oz. In cerebro-spinal meningitis, gelsemium in small repeated doses 1 or 2 drs. every 2 hours. It is indicated in delirium from any cause, in coughs of convulsive or spasmodic character. Gelsemium is used a great deal in the South in remittent fever; it is also used in irritable condition of the bladder; in tetanus give gelsemium for its soothing influence, in 2, 3 or 4 dr. doses; good for relieving post partum pains.

ARNICÆ—ARNICA.

ARNICÆ FLORES—ARNICA FLOWERS—ARNICÆ RADIX—ARNICÆ ROOT.

PREPARATIONS—EXTRACTUM ARNICÆ RADIS—EXTRACT OF ARNICA ROOT.

Dose.—Horse, 15 to 45 or 60 grs.; dogs, ½ to 3 grs.

EXTRACTUM ARNICÆ RADICIS FLUIDUM—FLD. EXT. ARNICA ROOT.

Dose.—Horse, 1½ to 3 drs.; dogs, 2 to 10 ms.

TINCTURA ARNICÆ RADICIS—TR. ARNICA ROOT.—This is the best and most used.

Dose.—Horse, ½ to 2 ozs., as diaphoretic 1 or 2 ozs. combined with other diaphoretics. Dogs, 5 to 30 ms.

There is also a TINCTURE ARNICÆ FLORUM.—Dose the same as the TR OF ROOT, but the ROOT is the best.

Composition.—An active principle called arnicine. The root contains an essential oil, on which depends in great part its physiological activity.

Antagonists and Incompatibles.—Its actions are antagonized by ammonia, alcoholic stimulants, opium, camphor, etc.

Synergists.—Aconite, veratrum viride, digitalis and arterial sedatives, generally increase the effects of arnica.

Physiological Actions.—Arnica is irritant, stimulant, depressant; antipyretic, diuretic, diaphoretic and is used as a vulnerary, it dilates the cuticular blood vessels. It irritates the gastro-intestinal tract. In alcoholic solution (as the Tr.) it inflames the skin when used full strength.

In small doses it increases the action of the heart, raises arterial tension, stimulates the action of skin and kidneys.

Large doses produce a transient excitement, followed by depressed circulation, respiration and temperature.

Toxic Doses cause violent headache, dilated pupil and muscular paresis; it paralyzes the nervous system of animal and organic life, causing collapse and death.

Uses.—Is remarkably efficient as a diaphoretic in 1, 1½ or 2 oz. doses diluted in one pint of water; ½ oz. fluid extract pilocarpus may be added at the outset of inflammatory diseases of any kind, such as lymphangitis, laminitis, pulmonary diseases, etc. Excellent to stop a chill and prevent the following fever or inflammatory action. It does this by dilating the blood vessels of the skin, thus attracting the blood to the surface and away from conjested internal organs. It is indicated in sthenic fever of any kind; azoturia, rheumatism, especially inflammatory or articular; congestion of brain, kidneys, etc., externally much used, but of little value on hairy animals.

Sweating mixture:

℞	Tr. arnicæ rad.,	℥ i., iss. or ii.
	Fl. Ex. pilocarpus,	℥ ss. to i,
	Aq. qs. ad..	Oj.

M. Sig.—Give at one dose; repeat in an hour if necessary. Blanket patient well with woolen blankets.

PILOCARPUS—JABORANDI.

There is a Tincture and an Infusion also an Extractum Pilocarpi Fluidum—Fld. Extract of Pilocarpus.

Dose.—Horse, ½ to 1 oz. but larger doses may be given, depending on the purpose for which it is given. Dogs, 15 ms. to 1 or 2 drs.

Composition.—Contains two alkaloids, Pilocarpine and Jaborine, these two alkaloids though isomeric are antagonistic in action, also contains a volatile oil and a peculiar acid..

Pilocarpinæ Hydrochloras.—An alkaloid which occurs in minute white crystals, deliquescent, odorless and neutral in reaction, very soluble in water and alcohol.

Dose.—(Hypodermically) Horse, 2 to 5 grs. if given alone, but 1 gr. at a dose is materially synergistic to eserine. Dog (by the mouth) 1-20 to ½ gr. (hypodermically) 1-40 to ⅙ gr.

Antagonists and Incompatibles.—Belladonna or atropine is directly opposite in action to pilocarpus or pilocarpine.

The caustic alkalies, persalts of iron and the salts of the metals generally are chemically incompatible.

Synergists.—Aconite, veratrum viride, gelsemium and vaso-motor paralyzers promote the activity of jaborandi.

Physiological Actions.—Pilocarpus is a paralyzer of the vaso-motor system, lowers arterial pressure and is a stimulant of the peripheral terminations of nerves supplying glands and involuntary muscular fibres, subsequently paralyzing the latter; it is therefore a powerful diaphoretic and sialagogue, a cardiac depressant by stimulation of the vagus ends, also myotic, emetic and sometimes abortifacient; its taste is hot and pungent. In horses it produces a prompt and very profuse salivation; while it has diaphoretic action in horses, it is not so marked as in the human, although, it is a valuable synergist to other diaphoretic drugs, particularly arnica.

The nasal, bronchial and lachrymal secretions are also much increased, as well as the intestinal secretions, which make pilocarpine a valuable synergist to eserine.

Pilocarpus or Pilocarpine in sufficient doses may cause watery diarrhœa. The action of the heart at first increased is afterwards lowered, arterial tension reduced and temperature falls from 1 to 4 degrees; it also greatly increases the quantity of urea excreted, but not the quantity of urine.

In Toxic Doses.—Respiratory power is lowered and apnœa may occur from excessive bronchial secretion, or œdema of lungs; pilocarpus is rapidly diffused and is eliminated by the skin and salivary glands; its effect lasting 3 to 6 hours; it increases contraction of the bladder, uterus and spleen.

Therapeutical Uses.—Dr. Quitman uses the hydrochlorate of pilocarpine to assist eserine in its action as a quick cathartic, as follows:

℞	Pilocarpinæ hydrochloratis,	gr. i. to grs. iss.
	Eserinæ sulphatis,	grs. iss.
	Aq. destil.,	ʒ i.

M Sig.—For doctor's use. (Use about 40 minims hypodermically, and then inject balance in 20 or 30 minutes if necessary).

Pilocarpus is also used in pleuritic and other effusions, to promote the absorption and elimination; used as expectorant in catarrh, bronchitis, pneumonia; combined with Tr. arnica Rad.

to stop chills and abort inflammatory diseases such as lymphangitis, laminitis, etc.

For Azoturia:

℞ Tr. arnicæ rad., ℥ vj.
Fl. ex. colchici sem., ℥ vj.
Fl. ex. pilocarpus, ℥ vj.
Spts. aeth. nit., ℥ vj.
M. Sig.—1½ ozs. every 3 or 4 hours in ½ pint of water.

The pilocarpine hydrochloras may be used as antidote to belladonna poisoning.

PHYSOSTIGMA—CALABAR BEAN.

EXTRACTUM PHYSOSTIGMATIS.

Dose.—Horse, 3 to 8 grs.; dogs, 1-10 to ½ grs.

TINCTURA PHYSOSTIGMATIS.

Dose.—Horse, 2 to 6 drs.; dogs, 2 to 20 ms.

EXTRACTUM PHYSOSTIGMATIS FLUIDUM—FLD. EXT. OF PHYSOSTIGMA (not official).

Dose.—Horses, ½ to 2 or 3 drs.; cattle, 2 to 6 drs.; of the powdered bean or seed 1 to 2 drs., but 1 dr. of the powder or Fld. Ext. is the average dose.

Composition.—Contains two alkaloids, PHYSOSTIGMINE OR ESERINE AND CALABARINE. Physostigmine is the only one used.

PHYSOSTIGMINÆ SULPHAS.—Occurs in white or yellowish white powders, very soluble in water and alcohol.

PHYSOSTIGMINÆ SALICYLAS.—Occurs in colorless, shining crystals, turning reddish on long exposure to air and light, odorless, bitter taste and neutral reaction, soluble in 130 parts of water and in 12 parts of alcohol at 59° F. Both are extremely hygroscopic.

Dose of both salts is the same.

Dose of eserine for horses, (hypodermically) ½ to 1½, up to 2 grs. in great emergencies; dogs, 1-100 to 1-50 gr., up to 1-25 gr. for very large dogs; the salicylate is said to keep better than the sulphate. Eserine sulphate can be obtained in sealed glass tubes containing 1, 1½ and 2 grs.; this is the best form in which to carry it as it cannot spoil and it can be depended on, it is put up by MERCK. Tablets are more or less unreliable and when a bottle or tube containing the drug is once opened, it rapidly spoils. The tubes containing 1½ grains are the best for general purposes.

Antagonists and Incompatibles.—Vegetable astringents, tannic acid, and caustic alkalies are chemically incompatible.

Physiologically.—Atropine antagonizes in part its action; chloral more so.

Therapeutically.—The tetanizing agents are opposed to physostigma.

Synergists.—The paralyzers or depressors of the motor nervous system; conium, gelsemium, amyl nitrite, etc., increase its effects.

Physiological Actions.—Physostigma is a muscular stimulant and a direct spinal paralyzer, producing complete general paralysis and abolishment of the reflexes, but does not affect muscular irritability, or the brain.

It stimulates secretion, excites nausea and vomiting, and is laxative or purgative by stimulating the muscular coat of the intestines, as well as by increasing the intestinal secretions. It first lowers then raises arterial tension, increases heart beat in frequency, but depresses the power of the cardiac muscles, though not destroying it. It produces in toxic doses, dyspnœa by a tetanic action on the respiratory muscles, causing carbonic acid gas poisoning and death by paralysis of respiration; it contracts the pupil, is then myotic; eliminated by the kidneys, the urine of affected animals poisoning another. In pregnant animals it may cause abortion.

Uses.—Very useful in constipation due to torpor of bowels, combined with belladonna, nux vomica and colchicum; in tetanus is used with varying results; it is antagonistic to strychnine and atropine poisoning.

For the Eye.—Eserine 1 or 2 grs. to the 1 oz. of distilled water is used to relieve congestion, inflammation and tension; to break up and prevent adhesions of the iris and lens, alternate with atropine; used to contract the pupil and vessels of the eye and thereby relieving pain and photophobia.

Dr. Quitman says, in case of obstinate constipation eserine is contraindicated where the intestinal murmur cannot be heard, showing paralysis of the bowels. Eserine is very beneficial in flatulent and spasmodic colic; give 1 gr. dose hypodermically, then repeat with ½ gr. dose in 20 or 30 minutes if necessary.

Lobelia—Indian Tobacco.

Tinctura Lobeliæ.

Dose.—Dogs, 3 ms. to ½ dr., ½ to 1 dr. as an emetic.

Extractum Lobeliæ Fluidum—Fld. Ext. of Lobelia.

Dose.—Horse, 1 dr. to 1 oz.; dog, ½ to 20 ms., as emetic 20, to 30 ms.

Composition.—Activity of lobelia is due to its alkaloid, LOBELINE; also contains lobelic acid.

Antagonists and Incompatibles.—Caustic alkalies; its depressing effects, by digitalis, belladonna, ergot, and other vasomotor excitants, by alcohol, ether, ammonia, etc; on the nervous system of animal life, strychnine, picrotoxin, thebaine, etc.

Synergists.—The motor depressants.

Physiological Actions.—It has an acrid nauseous taste and very unpleasant odor; it is expectorant, diaphoretic, purgative, emetic, antispasmodic, and narcotic; it excites an abundant flow of saliva, much gastric mucous, profuse urination and sweating, with great nausea, vomiting and great depression, the action of the heart is enfeebled, the blood pressure at first increased, soon falls, muscular debility, reduced temperature, then coma and death by paralysis of the respiratory centers, the motor nervous system is chiefly affected, especially the medulla oblongata and the nucleus of the pneumogastric contained therein.

Uses.—Lobelia is very useful in asthma in dogs or man, combined with belladonna and gelsemium; in heaves in horses, the same combination is very useful, followed with full doses of arsenic or Fowler's Solution. Lobelia is also excellent in dry coughs; for asthma in dogs give 15 to 30 minims of the Tr. of Lobelia ever 15 minutes till nausea sets in. It prevents the drying effect of belladonna on the throat.

ACIDUM HYDROCYANICUM DILUTUM—DILUTED HYDROCYANIC OR PRUSSIC ACID.

Character.—A colorless, volatile, faintly acid liquid, having an almond-like odor, very unstable; to preserve it best, keep it in an inverted blue bottle, well corked, and away from heat and light. If long kept it may become inert; strength 2 per cent.

Dose.—Horses and cattle, 20 ms. to 2 drs.; one-half ounce is often given in tetanus; sheep, 10 to 15 ms.; pigs, 2 to 7 ms.; dogs, ½ to 3 ms.; give well diluted; sometimes used to kill dogs easily.

POTASSII CYANIDUM—CYANIDE OF POTASH.—Occurs in white, opaque, amorphous pieces, having a sharp, somewhat alkaline and bitter almond taste and alkaline reaction; is deliques-

cent in moist air; when powdered is readily soluble in two parts of water, sparingly soluble in alcohol.

Dose.—Horse 1 to 2 up to 5 grs.; dogs, 1-15 to ⅙ gr.

Antagonists and Incompatibles.—The metallic salts are generally incompatible, also red oxide of iron, sesquioxide; these are too slow as antidotes.

In Case of Poisoning.—Remedies of greatest utility are cold affusion to spine, inhalation of ammonia, ammonia by the stomach and intravenous injection of it, subcutaneous injection of Tr. strophanthus, nitro-glycerin, ether or atropine may be used, but is too; slow artificial respiration; emetics; must act very quickly, as it kills quickly.

Physiological Actions and Uses.—Hydrocyanic acid and nicotine are the most powerful poisons known.

Externally.—Hydrocyanic acid paralizes terminations of the sensory nerves, thus it is a local anæsthetic and sedative; it is readily absorbed from raw surfaces, and may cause poisoning; externally, it is used to allay irritation of itching skin disease.

℞ Ac. Hydrocyanici dil., ℥ i.
Liq. potassæ, ʒ ss. to i.
Aq. Oj. ss.
M. Sig.—Apply to itching surface.

Internally, on the alimentary tract, it is quickly absorbed by the mucous membrane, and has the same effect on mouth and stomach as the skin, consequently it is useful to allay vomiting of dogs, as:

℞ Ac. Hydrocyan, dil., m. ii. to iii.
Bismuthi subnit., ʒ ss to i.
Aq. cinnamomi, ʒ vi.
M. Sig.—One drachm every two hours as long as necessary.

Also very useful in cough mixtures. For destroying the strongylus micrurus of calves, Prof. Williams gives 10 to 20 ms. of the acid conjoined with sodium carbonate and gentian.

Action on the Heart.—Large doses instantly arrest its diastolic action; it acts direct on the heart and on the center in the medulla; respiration and the spinal cord are also paralyzed by it, and it dilates the pupil.

Post-Mortem.—Leaves no characteristic lesions, but you may detect the odor of prussic acid; it is also useful in tetanus, and is occasionally used to kill the round worms of horses.

The Potassium Cyanide has the same action as prussic acid, but locally causes inflammation of the skin, and applied to broken surfaces may cause death.

Summary.—Prussic acid paralyzes all nerve structure in which it comes in contact; it is then an anodyne, antispasmodic, sedative and local anæsthetic; full doses paralyze the cerebro-spinal axis, killing by arresting the heart and respiration.

Amyl Nitris—Amyl Nitrite.—Yellowish or reddish yellow liquid, oily, very volatile, peculiar and very diffusive ethereal odor, insoluble in water, but soluble in all proportions in alcohol, ether and chloroform.

Dose.—Horse (internally) 10 to 30 ms., up to 1 dr., but is very seldom given internally; hypodermically, ½ this dose. By inhalation, ½ to 1 dr., and it must be fresh, as it rapidly deteriorates. Dogs, ½ to 3 ms. internally, and 1 to 5 ms. by inhalation. It is best used in thin glass capsules, called pearls, which are broken when required for inhalation.

Actions.—It produces the following results: Accelerates heart's action, greatly dilates the arterioles, by paralyzing their muscular coats; causes a sense of fulness in the brain with vertigo, fall in blood pressure due to dilation of the arterioles, lowering of temperature; when the vapor is applied direct to muscular or nerve tissues it suspends or completely arrests its functional activity; it depresses the nervous system and unstriped muscular fiber. It causes death by respiratory failure.

Uses.—Epileptic attacks may be warded off by its being inhaled; spasmodic asthma, used either internally, hypodermically or best by inhalation; in strychnine poisoning, angina pectoris, and in tetanus.

Nitroglycerin—Synonyms, Glonoin—Trinitrin.

Spiritus Glonoini—Spirits of Nitroglycerin.—A 1 per cent alcoholic solution; of this is used for horses, ½ to 1 dr. hypodermically; dogs, ¼ to 4 or 5 minims. This agent is a very powerful heart stimulant, used in collapse, heart failure, antidote for prussic acid, asthma, epilepsy. Dr. Quitman prefers it to digitalis as a heart stimulant.

Aconitum—Aconite.—Wolfsbane or Monkshood.

The part used in medicine is the tuber of aconitum napellus.

Extractum Aconiti—Extract of Aconite.—Prepared from the leaves; not much used in veterinary practice. Preparation

of the leaves are not official in the last U. S. P.—the root is 5 times stronger than the leaves.

Extractum Aconiti Fluidum—Fld. Ext. of Aconite.

Dose.—Horse, 5 to 15 ms.; cattle, 20 to 40 or 50 ms.; dogs, 1-10 to 1 m.

Tinctura Aconiti—Tr. of Aconite Root.—Strength 35 per cent of aconite root.

Dose.—Horse, 10 to 30 ms., for single doses about 40 ms. may be given. Cattle, 15 ms. to 1 dr.; dogs, 1-10 to 2 ms. Horses cannot stand as large doses of aconite in comparison as man.

Flemings Tincture of Aconite.—Strength 79 per cent.

Dose.—½ that of the U. S. P. Tr.

Aconitine.—Dose for horse, 1-30 to 1-5 gr. Not used to any extent in veterinary practice. Always dilute each dose of aconite with from 3 to 6 ozs. of water or other diluents as it has a peculiar local effect.

Composition.—Contains an active principle called aconitine in proportion of .03 per cent together with aconitic acid; also contains another principle called napelline, etc.

Antagonists and Incompatibles.—Alcohol, ether, ammonia, turpentine, digitalis, heat, etc. antagonize the action of aconite.

In Case of Poisoning.—The stomach should be evacuated and stimulants be administered by stomach or rectum and intravenous injections of ammonia, sulphuric ether, or hypodermic injections of digitalis and other heart stimulants; artificial respiration, to overcome the depression of the heart, which is the chief danger; the hypodermic injections of atropine is indicated, or nitro-glycerin would be best and one of the quickest; maintain the recumbent position when possible. Apply warmth externally.

Synergists.—All the agents of this group (motor depressants) increase the effects of aconite, cold, fatigue, and all depressing influences are synergistic.

Physiological Actions.—The taste is bitter, acrid and pungent, a small quantity causes a sensation of numbness and persistent tingling of the tongue and lips; Full medicinal doses cause a sense of constriction of the fauces, irritation of the gastro-intestinal mucous membrane with increased secretion, sometimes nausea and vomiting (in those that can vomit) and a peculiar

clicking sound due probably to spasm of the epiglottis, severe pains in joints and muscles, always more or less salivation, diaphoresis and diuresis, reduce respiratory power, decrease cardiac rate and force, lower arterial tension and temperature.

A Toxic Dose.—Produces great muscular weakness, dimness of sight; pupil at first may be dilated or contracted, but as end approaches remains dilated, shallow irregular and labored respiration, a slow and weak pulse, becoming rapid near the end, gulping, frothy saliva, belching, retching, nausea, etc. coldness of surface, clammy sweat, anxious countenance, extreme weakness of extremities, (animal goes down) lowering of temperature 2 to 3 degrees, abolishment of sensation, reflexes and motility and finally death from the paralysis of the heart and respiration, with or without convulsions, consciousness being preserved until near the end, when carbon dioxyde narcosis sets in.

Post-mortem shows shrunken lungs containing but little blood; trachea and bronchii contains much frothy mucous; right side of heart greatly distended with blood while left side is almost empty; ecchynotic spots are found in lungs, pleura and endocardium. Digestive organs do not appear seriously affected.

Aconite is a powerful sensory, cardiac, respiratory and spinal depressant, also diaphoretic, diuretic and powerful antipyretic; it chiefly affects the peripheral ends of the sensory nerves; they being affected first and from the periphery inwards. While the motor nerves are affected from the centers outwards; it relaxes the inhibitory apparatus of the heart and paralyzes the cardiac muscles and its contained ganglia, the respiratory centers and the spinal cord in all of its functions (sensory, reflex and motor), but does not affect the brain.

Aconite is rapidly diffused and slowly excreted, the effects of a full medicinal dose continuing for 3 or 4 hours.

Applied Externally.—It paralyzes the sensory nerves of the part, is therefore an anodyne and local anæsthetic.

MEDICINAL USES OF ACONITE.

Indications for its Use.—It antagonizes the fever process, when properly used is a most valuable drug; it is indicated in all affections, characterized by high resisting pulse, dry, hot skin, and elevated body temperature; is useful in Acute Throat Affections as laryngitis, pharyngitis and parotiditis, in small doses

often repeated. Indicated in ACUTE INFLAMMATION OF THE RESPIRATORY ORGANS. For pleurisy and peritonitis, at the outset give aconite with opium.

Indicated in simple fevers or in puerperal fever, INFLAMMATION OF THE BRAIN; in surgical fevers, but for surgical fevers Dr. Quitman prefers quinine; IN ACUTE OR INFLAMMATORY RHEUMATISM, IN ACUTE LOCAL INFLAMMATION, as arthritis or inflammation resulting from bruises, sprains, etc.

IN LYMPHANGITIS, in LAMINITIS, in ENTERITIS, if called early; in case of enteritis, Dr. Quitman gives 30 ms. of aconite and repeats 10 or 15 drops every hour and between times gives fluid extract belladonna 15 or 20 drops every hour, and externally hot woolen blankets wrung out of hot water and wrapped around the body.

In Mammitis.—Is also useful in large doses, combined with phytolacca; in spasmodic colic brought on by drinking cold water, give 15 to 25 drops of the tincture of aconite in the regular colic mixture; in congestion of bowels or liver, or in any congestion of any part, small, repeated doses are better than large ones.

Externally.—It is probably the best anodyne we have; very useful in liniments for all painful local affections.

For anodyne liniment:

℞ Tr. aconiti, ℥ iv.
Fl. ex. bellad., ℥ iv.
Linim. saponis, ℥ iv.
Spt. vini. rectif., ℥ iv.
M. Sig.—Apply 3 or 4 times daily.

VERATRUM VIRIDE, common name AMERICAN HELLEBORE.

EXTRACTUM VERATRI VIRIDIS FLUIDUM—FLUID EXTRACT VERATRUM VIRIDE.

Dose.—Horses, 15 ms. to 1 dr.; cattle, ½ to 1½ or 2 drs.; dogs, ¼ to 4 or 5 ms.

TINCTURA VERATRI VIRIDIS.—Contains 40 per cent of the root.

Dose.—Horses, ½ to 2 drs.; dogs, 1 to 8 ms.

Antagonists and Incompatibles.—Same as aconite.

Synergists.—Same as aconite.

Physiological Actions.—Veratrum Viride is closely allied to that of aconite, being a powerful cardiac depressant, and spinal paralyzant, but it affects respiration much less, is a systemic

emetic and cathartic, paralyzes the motor system centrally, impairing the reflexes, but leaves sensation unimpaired and has little or no diaphoretic or diuretic action, causes great depression, but is seldom fatal; when death does result it is from paralysis of the heart; small doses reduce the force of the pulse, but do not at first affect the rate, but if long continued the pulse becomes very slow, soft and compressible, rising on the least exertion, to be very rapid and feeble. It, like aconite, also causes great muscular weakness, and frequently nausea and vomiting; large doses increase the symptoms very much, the pulse becomes smaller and imperceptible, with as a result of toxic doses the same chain of symptoms as in aconite poisoning.

Treatment of the poisoning is the same as for that of aconite.

Uses.—Is inferior to aconite in fevers and inflammations, by reason of its lack of power over excretions, is used in about the same diseases as aconite.

PHYTOLACCA—POKE.—Contains a neutral principle.

PHYTOLACCIN an acid, tannin, etc.

EXTRACTUM PHYTOLACCÆ FLUIDUM—(ROOT).

Dose.—Horse, 2 drs. to 1 oz.; cow, ½ to 2 ozs.; sheep, 10 ms. to 1½ or 2 drs.; pigs, 5 ms. to 1 dr.; dogs, 2 to 30 ms. or up to 60 ms.

EXTRACTUM PHYTOLACCÆ (not official) dose, ⅛ that of the Fluid Extract.

Antagonists and Incompatibles.—Alcohol, ether, opium, digitalis, etc. oppose the action of phytolacca.

Synergists.—All depressing agents; the paralyzers and emetics aid its effects.

Actions.—Phytolacca is a cardiac and respiratory depressant, paralyzer of motion and of central action on the spinal cord; it is a slow and depressing emeto-cathartic, also somewhat narcotic and alterative; it irritates the throat, produces convulsions and death by paralysis of respiration; it promotes the absorption of adipose tissue.

Uses.—The chief use of this drug is in mammitis or mastitis to arrest the inflammation and prevent suppuration; the Fld. Ext. is used internally, and is also applied locally; is probably the best known drug for mammitis. Give quite large doses, 1 oz. 3 or 4 times daily. In VARICOSE ULCERS it promotes healing; in OBSTINATE ECZEMA the Extract is applied locally; it is said to be

useful in chronic rheumatism. Dr. Quitman advises the trial of the drug in other glandular inflammations besides mammitis.

EVACUANTS—EMETICS.

IPECACUANHA—IPECAC.

ALKALOID, EMETINE.

Dose of the Powdered Root.—Dog (as expectorant) ¼ to 2 grs. (as emetic) 5 to 30 grs. according to the size of the dog. Horse, ½ to 2 drs.

EXTRACTUM IPECACUANHÆ FLUIDUM.

Dose.—Dog, ½ to 5 or 10 ms. larger doses as emetics, from 15 ms. up.

TINCTURA IPECACUANHÆ ET OPII—LIQUID DOVER'S POWDER.

Dose.—Dogs, 1 to 15 or 30 mimims; there is also a wine and syrup of ipecac.

Antagonists and Incompatibles.—Salts of lead and mercury, vegetable acids and astringents are incompatible; bismuth, carbolic acid, hydrocyanic acid and narcotics generally, hinder its emetic action.

Synergists.—The emetics; its actions on the skin are increased by opium, warmth, etc.

Actions.—Nauseant, systemic and local emetic, expectorant, cholagogue, diaphoretic, hemostatic, sternutatory and counter-irritant, may cause pustules; small doses are stomachic.

Uses.—Is a safe non-depressant and sure, but slow emetic; is also a good expectorant in bronchitis when secretion is scant, also used against dysentery, jaundice, etc.

CATHARTICS.

RHAMNUS PURSHIANA, commonly known as CASCARA SAGRADA, English term (CHITTEM OR SACRED BARK). Bark of California Buckthorn.

EXTRACTUM RHAMNI PURSHIANÆ FLUIDUM.

Dose.—Dogs, ½ to 2 drs. as a cathartic, 5 to 20 minims as a stomachic.

FLUID CASCARA SAGRADA AROMATICUM, is a pleasanter form than the official Fld. Ext., dose the same.

Action and Uses.—Used as a non-irritant laxative or cathartic, tonic; small doses are stomachic; to overcome chronic con-

stipation, give small repeated doses; very useful in dog practice.

Oleum Ricini—Castor-oil.—A fixed oil expressed from seeds of the common castor, the purer the oil, the less purgative; the dark colored is most active.

Actions and Uses.—A mild, certain and efficient laxative; in dogs, operates in from 1 to 4 hours, causing but little pain and producing free evacuations; the intestinal secretions are but slightly increased, hence, the stools are not very liquid; its purgative principle enters the blood and the milk of the mother may acquire purgatives properties; it is used wherever a gentle laxative is indicated. Is occasionally given to the mother for its effects on the suckling.

Dose.—Dogs, 1 dr. to 2 ozs.; cats, ½ dr. to ½ oz.; pigs, 1 to 4 ozs.; sheep, 2 to 4 ozs.; horses, 1 to 2 pints; is often used in equal parts with linseed-oil for horses, say 8 to 12 ozs., of each.

TONIC, ASTRINGENT AND RESIN-BEARING PURGATIVES.

Sennæ—Extractum Sennæ Fluidum.

Dose.—Dog, ¼ up to 2, 3 or 4 drs. Powdered senna, same dose.

Syrupus Sennæ.

Dose.—Dog, ½ dr. to 1 oz. More agreeable than the Fluid Extract.

Actions and Uses.—Has a very bitter and nauseous taste, but is a serviceable and quick-acting purgative; does not cause inflammation or superpurgation and is not followed by constipation; is so disagreeable that dogs frequently vomit it up.

Rheum—Rhubarb.—The root is used.

Dose.—Dogs, 10 grs. to 3 drs. of the powdered root.

Extractum Rhei Fluidum.—Fluid Extract of Rhubarb.

Dose.—Dogs, 10 ms. to 3 drs.

Extractum Rhei—Extract of Rhubarb.

Dose for dogs.—3 to 15 grs.

Tinctura Rhei Aromatica—Arom. Tr. of Rhubarb.—Contains rhubarb, cloves, cinnamon, nutmeg.

Dose.—Lamb, ½ to 1 dr.; calves, 1 to 4 drs.; dogs, ½ to 1 dr.; colt, 1 to 3 drs.; sheep, 4 to 8 drs.

Syrupus Rhei Aromaticus.

Dose.—Dogs, 1 to 4 drs.

It is useful where there is a lack of tone to the bowels; used

in diarrhœa in small doses, for its stimulating tonic action; is laxative in large doses or may be combined with other laxativse, to prevent griping in milk fed animals, or may be combined with bismuth, opium or sulphuric acid, to stop diarrhœa.

Actions.—Rhubarb is a stomachic tonic, astringent, mildly cathartic and cholagogue.

Uses.—As a laxative or purgative. For dogs, 1 to 3 drs. of the Fluid Extract or powdered root combined with 1 to 2 grs. of calomel or the aromatic syrup with 3 to 5 grs. of resin of jalap and calomel is a nice combination. It is used in small doses as a stomachic tonic, and tonic astringent in diarrhœas, due to lack of tone in the bowels.

Aloe—Aloes.—Inspissated juice of the leaves of various species of aloes—official varieties.

Aloe Barbadenis—Barbadoes Aloes or Hepatic Aloes.—Deep brown color or orange brown, most used in veterinary practice.

Aloe Capensis—Cape Aloes.—Blackish brown.

Aloe Socotrina—Socotrine Aloes.—Yellowish brown color. The active principle is aloin which differs slightly in the different species.

Dose, as a stomachic, horse, 1 dr., as a purgative, ½ to 1½ ozs. The average dose when given with some synergist, as calomel is 6 or 7 drs. usually given in form of a bolus, rubbing it up carefully with water or other excipient, or given in linseed-oil, should be combined with some correctives as ginger and nux vomica which aid its action and prevents griping; for *young foals* several months old 5 grs. of aloes for each week of their age.

Dose. Cattle, 1 to 2 ozs.; sheep, ½ oz. but for cattle and sheep the salines are preferred; dogs, 2 to 30 grs. up to 1½ drs.; swine, 1 to 4 drs., as a bitter tonic ⅛ to 1-10 these doses. The dose of aloin for horses is 2 drs.

Physiological Actions.—Aloes is purgative, acting chiefly on large intestines; small doses are bitter tonics; applied externally is stimulant and desiccant; it stimulates both peristalsis and secretion, increases secretion of bile; also is diuretic; the barbadoes is most active and uniform in its effects. It should be kept in lumps in tin cans or other good containers, only being powdered for immediate use; in melting aloes don't let the tempera-

ture rise above 120 degrees, as it impairs the activity by converting the active aloin into inert resin.

Aloes operates in from 16 to 24 hours after administration; don't repeat an aloetic purge until 48 hours have elapsed.

Uses.—In dyspepsia with capricious appetite, irregularity of the bowels, hide-bound horses; worms; is used in colics, both spasmodic and flatulent, for overloaded condition of the bowels; to promote excretion of waste products from the bowels and the blood, and consequently relieve febrile symptoms, rheumatic attacks, skin irritation, swollen limbs and inflamed joints; in lymphangitis to prevent and aid in curing. By attracting the blood to the bowels, it is useful in congestion or inflammation of the brain and spinal cord; full doses being necessary; in paralysis, the paraplegia or hemiplegia or reflexed paralysis due to indigestion give a full purgative.

Aloes should not be used in irritation or inflammation of the alimentary canal or piles; (Dr. Quitman very rarely gives an aloetic purge where the temperature is above 102°). Or hemorrhage from the rectum, in high fevers is apt to cause superpurgation, also should not be used where there is great debility or weakness. In influenza the bowels are apt to be irritable and oil is preferable to aloes. Don't use during pregnancy, may cause abortion. For young foals or other animals, the gentler purgative, such as linseed-oil or castor-oil should be used.

In chronic constipation 2 drs. of aloes with gentian, ginger and nux may be given once daily.

To make watery infusions rub up the aloes in hot water; There is a tincture of aloes.

Dose for human, ½ dr. to 1 oz. besides numerous other preparations.

Drastic Purgatives.

Jalapa—Jalap.—The tuberous root is used; contains 15 to 20 per cent of the official resin.

Preparations.—Extractum Jalapæ—Resina Jalapæ.

Dose of either.—Dog, 1 to 10 grs. medium sized dog, 5 grs.

Pulvis Jalapæ Compositus.—Composed of jalapa 35 parts, bitartrate of potash 65 parts.

Dose.—Dog, 5 grs. to 1 dr.

Pulvis Jalapa—Powdered Jalap.

Dose.—Dog, 10 grs. to 1 dr.; pigs, 1 to 4 drs.; cats, 5 to 30

grs. By adding calomel to jalapa its power is increased; jalap is more active than senna, but is less powerful and irritating than gamboge, podophyllum, elaterium or colocynth, it also stimulates secretion of bile.

SCAMMONIUM—SCAMMONY—RESINA SCAMMONII.—RESIN OF SCAMMONY.

Dose.—Dog, 1 to 8 grs. Resembles jalap but more drastic. Seldom used in dog practice.

PODOPHYLLUM—MAY APPLE.

EXTRACTUM PODOPHYLLI.

Dose.—Dogs, 2 to 10 grs,

RESINA PODOPHYLLI.—Commonly known as PODOPHYLLIN.

Dose.—Dogs, ⅛ to 1 gr.

EXTRACTUM PODOPHYLLI FLUIDUM.

Dose.—Dog, 1 to 30 ms.

Scammony stimulates the flow of bile, is used particularly where the secretion of bile is deficient, usually combined with other drugs as belladonna, physostigma and nux vomica.

Prescription for habitual constipation in dogs.

℞	Resinæ jalapæ,	grs. vi.
	Ext. bellad.,	grs. iii.
	Ext. physostigma,	grs. iii.

M. Ft. Pil. No. 12. Sig.—Give one at night.

HYDRAGOGUE CATHARTICS.

CAMBOGIA—GAMBOGE.—Is dangerous, should be used only for cattle if used at all. It is a gum resin.

Dose for cattle, 2 to 4 drs. is very irritating and is apt to cause superpurgation.

OLEUM TIGLII—CROTON-OIL.—A fixed oil expressed from the seeds of croton tiglium.

Dose.—Horse, 10 to 25 ms.; cattle, ½ to 1 dr.; sheep and swine, 5 to 10 ms. dog, ½ to 3 ms., administered in bolus or in oil; croton-oil is a viscid, amber colored liquid, nauseous odor and acrid taste.

Physiological Actions.—Is a powerful irritant, vesicant and pustulant, is a drastic hydragogue cathartic; full doses cause gastro-enteritis and much prostration; undiluted it seriously and deeply inflames the skin, causing severe blemishes and by absorption may cause fever and superpurgation.

Medicinal uses of CROTON-OIL.—Cattle are the only animals

for which it can be used with any degree of safety; it can be used for dogs and pigs if used with great caution. For horses and sheep it is too irritating and depressing; is used in cattle as an active hydragogue purgative when they suffer from fardel bound, and other forms of constipation and from torpidity of the bowels. Should not be used in debilitated, delicate or young animals. If an over-dose has been administered combat with demulcents, opium and stimulants. It should not be used as a counter-irritant or applied to the skin in any form or for any purpose.

For cattle a purgative composed of 10 to 40 ms. of croton-oil with ½ to 1 dr. of calomel and 1 lb. of Glauber salts is a very good mixture, dissolved in water, or linseed-oil 1 or 2 pints, may be given instead of the salts; may be used for obstinate constipation or torpidity of the bowels.

ENEMAS—INJECTIONS.

Most common, hot water and soapsuds; some use an infusion of tobacco, but Dr. Quitman recommends 1 or 2 ozs. of glycerin in preference to any; it attracts moisture to the parts and stimulates peristalsis; in small animals hot oil is sometimes used.

In the human INTESTINAL INVAGINATION has been quickly relieved by sudden inflation of the large intestines with carbonic acid gas; the process consists in the injection of a solution of sodium bicarbonate, followed by a solution of tartaric acid about 1 dr. of each to each ½ pint of water; the escape of gas through the sphincter ani must be prevented by forcible pressure upon the anus. Dr. Quitman recommends trying this on our patients.

ANTHELMINTICS.

This includes VERMIFUGES and VERMICIDES. These should be administered on an empty stomach.

REMEDIES FOR EXPULSION OF ASCARIDES LUMBRICOIDES OR MEGALOACEPHALO—COMMON ROUND WORMS.

SANTONICA.—Its active principle (Santoninum) is used.

SANTONINUM—SANTONIN. — Occurs in colorless, flattened prisms.

Dose according to experiments by Frohner; average safe dose for cattle, 1 to 3 ozs.; horses, 6 drs. to 1½ ozs.; sheep and

goats, 75 grs. to 2½ drs.; dogs, 5 to 30 grs. for very large dogs; these doses are for matured animals only; young animals should receive very much less at a dose; young dogs should not exceed ⅙ to 3 grs. Calomel increases its power.

SPIGELIA—PINK ROOT.

EXTRACTUM SPIGELIÆ FLUIDUM.

Dose.—Matured dogs, 10 ms. to 2 drs.; puppies up to 8 weeks old, 1 m. for each week of age. Should always be combined with a brisk cathartic. The Fluid Extracts of spigelia and senna combined make a most satisfactory anthelmintic for dogs.

ARECA NUT—SEEDS OF ARECA CATECHU.—BETEL NUT.

PULVIS ARECÆ SEMINA.

Actions and Uses.—Is astringent and an effective vermicide, especially for dogs; destructive to both tape and round worms; in horses and cattle it is not certain in its results.

Dose.—Dog, 5 to 10 grs. for small dogs, and 15 grs. to 2 dr. for large dogs; horses, 1 to 1½ ozs. For dogs the dose is about 2 grs. for each pound of the dog's weight, best administered in milk.

For tape worm in dogs.—(50 pound dog)

℞	Pulvis arecæ sem.,	ʒ jss.
	Oleoresina aspidii	m xx to xxx.

M. Sig.—Give at one dose in milk. Repeat in 48 hours.

Or the powdered male fern 1 to 2 ozs. for dogs may be used, but is too bulky.

REMEDIES AGAINST TÆNIÆ OR TAPE WORM.

Preparation.—First, fast your patient, only allowing a little milk, then give a purge, then administer the tæniafuge, always look for the head of the tape worm, for if not removed it will reproduce itself.

ASPIDIUM—MALE FERN.—Filix Mas.

OLEORESINA ASPIDII.—Oleoresin of male fern.

Dose.—Horses, 2 drs. to 4 ozs. average dose 1 oz.; dogs, 5 to 10 ms. up to 1 or 2 drs. according to size.

Male fern combined with areca nut or oil of turpentine makes the best tæniafuge. Chloroform is also used with it.

FOR THREAD WORMS occupying rectum, use the following remedies: Infusions of quassia or aloes; or carbolic acid 20 to 30 ms. to water 1 pint or Tr. chloride of iron 1 to 1½ ozs. to the pint.

URINO-GENITALS.

These remedies are used for their actions on the genito-urinary organs; they increase the activity of the kidneys and excite the function of the genital organs; in excessive quantity or long continued may set up inflammation of kidneys, produce strangury and bloody urine, excite uterine contraction, and stimulate to an unnatural degree, the sexual appetite; they contain an essential oil or principle, which is eliminated by the urinary passages and excites local irritation by direct contact.

TEREBINTHINA.—TURPENTINE is an oleoresinous exudation, liquid or concrete, consisting of a resin combined with a particular oil named oil of turpentine, and generally procured from various species of cone bearers (pines); 2 turpentines are official, viz.:

TEREBINTHINA, obtained from the yellow and other species of pine, a concrete oleoresin in tough yellow masses, and TEREBINTHINA CANADENSIS—CANADA TURPENTINE OR BALSAM of FIR, a liquid oleoresin, obtained from the silver fir or balm of Gilead; a viscid yellowish liquid, drying on exposure into a transparent mass.

The chief preparation used in veterinary practice is OLEUM TEREBINTHINÆ or OIL OF TURPENTINE, often but erroneously called SPIRITS OF TURPENTINE; it is a volatile oil, distilled from turpentine.

Characters.—A limpid, colorless liquid, of a peculiar, strong odor and bitter pungent taste; mixes with other volatile and fixed oils, soluble 1 in 6 of alcohol, very soluble in chloroform and insoluble in water.

Dose.—Horse, ½ to 2 or 3 ozs.; cattle, 2 to 6 ozs.; sheep, 1 to 3 drs.; dogs, 5 to 40 ms.; pigs, 1 to 2 drs. Best administered in linseed-oil or gruel. Small doses as diuretics and large doses as anthelmintics.

Physiological Actions.—Externally, rubefacient, irritant and counter-irritant; vesicant if rubbed in or confined, also an antiseptic and disinfectant; is absorbed by the unbroken skin.

Internally.—Is diuretic, stimulant, carminative, antispasmodic, hemostatic, and anthelmintic; it is irritant, and large doses undiluted may cause gastro-enteritis. Linseed-oil is a good diluent.

Toxic Doses.—Paralyze nerve centers, small doses stimulate

the vaso-motor centers; hence it raises blood pressure, but large doses paralyze them and lower blood pressure.

Elimination.—Is excreted chiefly by the kidneys and lungs, which are stimulated to increased action by small doses, but their action is lowered by large doses, after brief stimulation.

Uses.—In colic, both spasmodic and flatulent; for worms, septic fevers, gangrene of lungs, catarrhal conditions, pneumonia and bronchitis, as a diuretic, but others not as irritant are better. In liniments 2 to 4 drs. to the pint for stimulating effects. For local gangrene remove the dead tissues and then apply the turpentine direct to the affected parts, by means of absorbent cotton or cloth saturated with it; the fetor is removed and sloughing arrested. It is equally useful for furuncles, phagedenic ulcers, etc.

Copaiba—Capaiva.—An oleoresin.

Oleum Capaibæ.

Dose.—Same as turpentine.

Actions.—Similar to oil of turpentine, is stimulant, diuretic, diaphoretic and expectorant; it acts as an antiseptic to the genito-urinary apparatus, and is used chiefly in gonorrhœa in man.

Juniperus—Juniper.

Oleum Juniperi—Oil of Juniper.

Dose.—Horse, 1 to 2 drs.; cattle ½ to 3 drs.; dogs, 2 to 10 15 ms., repeated every three hours.

Oleum Cadinum—Oil of Cade.—A product of the dry distillation of wood of a certain specie of juniper, used as an application in chronic skin disease, especially parasitic; used full strength or diluted one-half, or combined with other agents in salves, lotions, etc. It resembles tar in color and odor. Oil of Juniper is used only as a diuretic, and is very good; is stomachic in small doses, and is aphrodisiac.

Buchu.—Dose, Fluid Extract, dogs, 5 ms. to 1 dr.; horses, 1 to 2 ozs.

Uva Ursi.—Dose of Fluid Extract, dogs, 10 ms. to 2 drs.; horses, 2 to 4 ozs.

These two drugs are tonic astringents, diuretic and useful in chronic cystitis; also used in dysuria and calculous affections.

Scilla—Squill—Syrupus Scillæ.

Dose.—Dogs, 10 ms. to 1 dr.

Extractum Scillæ Fluidum—Fluid Extract Squill.

Dose.—Dog, ¼ to 5 ms.

Actions.—On the circulation; acts like digitalis; large doses cause vomiting and purging, is used chiefly for its expectorant and diuretic effects; should not be used in nephritis as it is too irritating.

There is also a tincture, a vinegar and a compound syrup of squills.

Oleum Rutæ—Oil of Rue and Oleum Sabinæ—Oil of Savine.—These are used chiefly in human practice as Emmenogogues, and abortifacients.

Dose.—Bitches, 1 to 5 ms.; their combination with aloes and myrrh make a powerful abortifacient. They are irritating and should be well diluted in oil.

COUNTER-IRRITANTS.

Cantharis—Cantharides—Pulvis Cantharidis — Powdered Cantharides also Tinctura Cantharidis—Tr. of Cantharides.

Actions.—Externally, is irritant, rubefacient, vesicant, according to the strength used, it produces water blisters, counter-irritant, etc.

Internally is irritant, large or undiluted doses cause gastro-enteritis; small doses stimulate the genito-urinary tract, hence, is diuretic and aphrodisiac.

Full doses cause inflammation, strangury and hæmaturia.

Uses.—Internally is seldom used except in incontinence from debility or partial paralysis of the bladder.

Externally is used as a rubefacient, blister, or as a counter-irritant; blister is formed in from 2 to 10 hours, if repeatedly used may cause sloughing of tissues; cantharides can be used wherever a blister or counter-irritant is required, except in inflammation of the urinary organs, as it is absorbed and will increase the inflammation. Don't use cantharides too strong on thin skinned horses, not at all on very weakly patients, and with caution on dogs, and not at all on very young animals.

For blistering ointment.

℞	Pulv. canth.,	ʒ ii. to iiss.
	Hydrarg. iod. rubr.,	ʒ ii. to iiss.
	Adipis.,	ʒ iii.

M. Sig.—Blister, to be well rubbed in for 10 or 15 minutes.

Catharides alone is used 1 to 6 or 1 to 4; for dogs, 1 to 12,

always clip off the hair close, before applying a blister; tie the horse so he cannot bite it; wash and grease, etc.

RUBEFACIENTS.

SINAPIS—MUSTARD.

SINAPIS ALBA—WHITE MUSTARD.

SINAPIS NIGRA—BLACK MUSTARD.

OLEUM SINAPIS.—A volatile oil, obtained from black mustard seed.

The Mustard flour is the form most used. Coleman's English Mustard being the best.

Actions.—Is irritant, rubefacient, vesicant or suppurant, according to the manner in which it is used; it acts much quicker than cantharides, but its action is not so prolonged; the paste is made with water and rubbed into the skin of horses, produces its effects within 20 minutes; in 2 to 6 hours vesication occurs, pustules may occur where the paste is used very strong, or closely repeated, or too much friction is being used. The volatile oil of mustard is a very powerful vesicant and acts very quickly.

Uses—One or two teaspoonfuls in 1 or 2 ozs. of warm water makes a very good emetic for dogs; it is used as a counter-irritant in sore throats, laryngitis or pharyngitis, bronchitis, pneumonia, and pleurisy, or wherever a counter-irritant is indicated; applied in early congested stages it lessens the pain and relieves difficult breathing, besides limiting the amount of blood in the parts; it thus limits or decreases the inflammatory action; also useful in the exudative stages of these diseases; to promote the absorption of exudate and thus hasten resolution, or where these diseases remain dormant; can be used in spinal diseases or even in congestion of the kidneys; it acts best when applied and left on 20 or 30 minutes, then wash off and repeated in an hour or two; also used in acute indigestion, applied to the abdomen; also in colic, enteritis and peritonitis; in phlebitis mustard can be used but a cantharides blister is better. In making a mustard plaster, take the pure mustard and gradually pour in warm water but not hot; can also be made with cold water or vinegar; rub in with moderate friction. (See prescription for counter-irritant, under aq. ammon. fortior.)

BLOOD-LETTING—BLEEDING.—Useful in azoturia and acute congestion; congestion of the lungs is sometimes relieved by it. In founder in first stages, bleed from the coronary artery; always

best to bleed your animal while up if possible. Always use antiseptics in this operation. Take from three to six quarts of blood, but the pulse is the best indication as to the amount of blood to be drawn. As a rule we are able to accomplish with drugs the same effects that bleeding produces.

ESCHAROTICS.—This includes the mineral acids, caustic potash, chloride and sulphate of zinc, arsenous acid, corrosive sublimate, etc., which have been studied under their proper heads; also ACIDUM CHROMICUM—CHROMIC ACID, occurs in deep red, needle-formed crystals, very soluble in water, forming an orange red solution.

Actions.—Is an oxidizing caustic, is slow in action and not very painful, but penetrates deeply and is very destructive, and on account of its penetrating so deeply it should be used with great care. Mice or birds soaked in it will entirely disappear; also destroys bone; always protect the surrounding tissues with oil or vaseline.

Uses.—Used entirely to destroy growths, as warts, tumors, ets. Sometimes used in weak solution to touch up indolent ulcers; can be made into a paste with water. Sloughing occurs in 24 to 48 hours.

It is explosive with strong alcohol, glycerin or spirits of nitrous ether, etc.

EMOLLIENTS, DEMULCENTS AND PROTECTIVE AGENTS.

GLYCERINUM—GLYCERIN.—Soluble in water and alcohol; it is antiseptic and emollient.

Uses.—Is used as an emollient where indicated, and useful as an enema in constipation or flatulence.

COLLODIUM—COLLODION—SOLUTION OF GUN COTTON IN ETHER AND ALCOHOL—COLLODIUM FLEXILE—FLEXIBLE COLLODION—COLLODIUM STYPTICUM—STYPTIC COLLODION.—Collodion painted over wounds forms an air tight coating and in small wounds keeps edges in a fixed position and promotes healing; styptic collodion can be used over raw bleeding surfaces. Keep in well stoppered bottles.

ACACIA—GUM ARABIC—MUCILAGO ACACIA, mucilage of GUM ARABIC.—Used as an emollient or demulcent and as a vehicle for nauseous or irritating drugs; also to make an emulsion for insoluble drugs.

TRAGACANTHA—TRAGACANTH—MUCILAGO TRAGACANTHÆ, used the same as acacia.

DEMULCENTS include the fixed oils also.

LINSEED INFUSION, flaxseed 2 ozs. to 1 pint boiling water; SLIPPERY ELM BARK in an infusion.

GLYCYRRHIZA — LICORICE ROOT.—The powdered licorice root is used or the EXTRACTUM GLYCYRRHIZÆ FLUIDUM.

Dose of Either.—Dogs, 1 to 2 drs.; horse, 1 to 2 ozs.

MISTURA GLYCYRRHIZÆ COMPOSITA.—Compound licorice mixture, commonly known as BROWN MIXTURE, a nice simple expectorant, containing paregoric, wine of antimony, gum arabic and spts. of nitrous ether. This mixture is very useful in dog practice. Quinine, ammonium Carb. or chloride, etc. may be added as indicated.

Dose.—Dogs, ½ dr. to ½ oz.

Actions and Uses.—The remedies of this group contain mucilaginous constituents on which their properties depend; they are used as protectives in gastro-intestinal disorders or for excoriated surfaces, and as expectorants in bronchial affections. (Licorice.)

POULTICE.—Materials most frequently used for poultices are first and best, flaxseed meal; then powdered slippery elm bark, bran and dried hops. For poultices of linseed, pour on hot water to make a paste, repeat poultice every 2 or 3 hours; use antiseptics in poultices as a sol. of bichloride of mercury when applied over a wound, for mud fever or grease heel, powder top of poultice with charcoal.

Actions and Uses.—Used to apply continuous heat and moisture, and to soften, soothe and relax the tissues; they dilate the blood vessels and thus allow the blood to flow on, relieving pressure and pain. If used early in the inflammatory action they diminish it, later they increase and promote suppuration by promoting the diffusion of fluids and escape of white corpuscles and purulent elements. They should not be continued too long as they will make the tissues soft and flabby. Dr. Quitman says, never approve of using cow manure as a poultice.

DRUGS ADVISED BY DR. QUITMAN TO BE CARRIED IN CASE.

1. Acetanilid.
2. Tr. Aconite Root.
3. Quinine Sulphate.
4. Alcohol.
5. Acetic Acid.
6. Ammon. Carb.—Aq. Ammon.—Arom. Spts. of Ammon.
7. Spts. Aeth. Nit.
8. Pot. Nitrate.
9. Boric Acid.
10. Salicylic Acid.
11. Carbolic Acid.
12. Corrosive Sublimate.
13. Soda Hyposulphite.
14. Zinc Oxide.
15. Vaseline or Lard.
16. Lead Acetate or Goulard's Ext.
17. Aloes Barb.
18. Calomel.
19. Colchicum Sem. Fld. Ext.
20. Soda Sulphate.
21. Eserine—Physostigma Fld. Ext.
22. Linseed Oil.
23. Bellad. Fld. Ext.
24. Cannabis Ind. Fld. Ext.
25. Gelsem. Fld. Ext.
26. Morphine—Pulv. Opii or Tr. of Opii.
27. Digitalis Tr. or Fld. Ext.
28. Ergot, Fld. Ex.
29. Ol. Terebinth.
30. Fowler's Sol. of Arsenic.
31. Nux Vomica or Strychnine.
32. Iron, Sulphate and Tincture Chloride.
33. Gentian or Ginger.
34. Glycerin.
35. Iodine Crys. or Tr.
36. Red Iodide of Mercury.
37. Cantharides.

SUPPLEMENTAL LIST.

Croton Oil.
Chloroform.
Pilocarpus, Fld. Ext.
Arnica, Tr.
Brom. Pot. or Chlor. Hyd.

Appendix.

The following drugs were either omitted from their proper classification, or have more or less recently come into common use.

EUCAINE HYDROCHLORATE.

Properties.—This occurs in the form of a white neutral, crystalline powder, soluble in 10 parts of cold water; solutions stronger than 9 per cent are not stable and will separate crystals of eucaine.

Solutions of eucaine less than 9 per cent do not decompose and may be sterilized (boiled) without suffering deterioration.

Actions and Uses.—This drug has the same physiological actions and uses that COCAINE has; its advantages over cocaine lie in the fact that it is far less poisonous, and solutions of eucaine are permanent and do not, like those of cocaine, decompose when kept; again, solutions of eucaine can be boiled for the purpose of sterilization, whereas solutions of cocaine are decomposed by this process.

It is used in solutions varying from ½ per cent up to 9 per cent. For dogs usually a 2 per cent and for horses a 5 per cent solution is used.

A few drops (10 to 20) being enough to paralyze a large nerve trunk, (the metacarpal nerve for instance).

It is said to have more powerful anæsthetic effects than cocaine.

It may be incorporated in salves, powders, lotions, etc. in the same way that cocaine has heretofore been used.

It can be carried conveniently in solution, say a 5 per cent solution, make this by adding 15 grains of eucaine to 5 drachms of distilled water, this can be boiled before using and thus it is

not necessary to add antiseptics to the solution, for the purpose of preserving it.

FORMALIN.

The name formalin is applied to a 40 per cent solution of chemically pure Formaldehyde in water.

Formaldehyde is a gaseous product which is prepared by subjecting methyl alcohol (wood alcohol) to oxidation. It is readily absorbed by water and is put on the market in the form of a saturated aqueous solution, termed Formalin.

Formalin mixes with water in all proportions.

Actions.—Formalin is a powerful and harmless antiseptic, disinfectant, deodorant and antizymotic.

Uses.—As an antiseptic applied to wounds, it is used in from ¼ to ½ of one per cent solutions.

As a general antiseptic for hands and instruments, a ½ of 1 per cent to a 2 or 3 per cent solution is used.

As a deodorizer for fæcal and other extraneous matter a 1 per cent solution is sufficient.

Stables may be disinfected by spraying it into the air from an atomizer or by heating a solution of it (about a 20 per cent solution) on a stove. Its fumes are somewhat irritating but not dangerous. For hardening anatomical specimens 4 to 10 per cent solutions.

It is said to be more powerful than corrosive sublimate, as an antiseptic and at the same time devoid of danger.

BARII CHLORIDUM.

Barium chloride, occurs in colorless, flat, four-sided crystals, of a bitter, salty taste. Soluble in 2½ parts of water, almost insoluble in alcohol.

In small doses it is occasionally but not often used as a cardiac tonic. Externally it is used as collyrium and lotion for wounds in the strength of ½ to 2 parts to 100 of water.

Its only use in veterinary practice is as a powerful and rapid purgative, its effects being produced usually in from 15 to 30 minutes.

The dose for a horse per os is from 30 grains to 2 drachms, in ½ pint of water; some veterinarians give as much as 3 or 4 drachms, but I would warn the prescriber from administering

more than two drachms at the outside, as at best it is a very dangerous drug.

INTRAVENOUSLY, it is administered in doses averaging 15 grains; for this method, the drug should be dissolved in distilled water, 1 or 2 drachms and twice filtered through the same paper, the needle should be sterilized and the air expelled from the syringe by pressing the piston until the liquid starts to flow from the needle.

It should not be injected under the skin as it will raise a large, and very painful swelling, which may slough and the drug is inactive as a cathartic when used in this manner.

On the whole I advise against the use of the drug; while it is highly satisfactory in some cases, in others it produces some very unlooked for and unpleasant results, i. e., extreme colicky pains, muscular twitchings and spasms, great weakness, pulse becoming almost imperceptible; sometimes the horse will recover from this condition, occasionally he dies rather suddenly and again he may become prostrated and lie almost lifeless, though perfectly conscious, for several days and then die.

Post-mortem shows extreme engorgement of the blood vessels of the intestines, with more or less inflammation.

The toxic symptoms described are not those of excessively large doses, but have occurred as a result of medicinal doses (½ to 2 drachms).

To combat the toxic symptoms, one must commence early and administer stimulants, such as alcohol, sulphuric ether and aromatic spirits of ammonia, these may be combined and given in one ounce doses of each; in addition special heart stimulants may be required, preferably a 1 per cent solution of nitroglycerin in 1 to 2 drachm doses per os or hypodermatically, or Tincture Strophanthus or Digitalis.

On the whole as a quick cathartic, Eserine is a much safer and more reliable drug.

ANTITOXINS.

TETANUS ANTITOXIN.

This agent I have no doubt in saying is a failure as a curative agent for tetanus.

As a preventive it may have some value.

The preventive dose is 10, C. C. (about 150 minims) to be repeated if necessary 8 or 10 days later.

The curative dose is 50, C. C. (about 750 minims) injected at one time, with subsequent injections of 20, C. C. (about 5 drachms) according to circumstances.

TUBERCULIN.

This is a glycerin extract of the germs of tuberculosis. It contains no living germs of tuberculosis and therefore does not communicate the disease to a healthy animal, the milk of the cow is unaffected by its use and it does not interfere with gestation, even if the cow is ready to calf.

It is used in veterinary practice entirely as a diagnostic agent, i. e. to positively diagnose tuberculosis in cattle when it is in its incipient stages and not far enough advanced to make a diagnosis by physical examination.

Tuberculin may be obtained in what is termed "Concentrated Tuberculin" and "Tuberculin Solution." Tuberculin will keep for several months. If it is desirous of keeping it in stock, it should be kept in the concentrated form and solutions made as required.

The solution of the "concentrated Tuberculin" is made by adding 1 C. C. of it to 9 C. C. of a ½ of 1 per cent carbolic acid solution (5 to 1000).

The solution will retain its activity for 2 or 3 weeks if the vial is unopened and kept in a cool, dark place.

DIRECTIONS FOR USING TUBERCULIN FOR THE DIAGNOSIS OF TUBERCULOSIS.

The febrile reaction in tuberculous cattle following the subcutaneous injection of tuberculin begins from six to ten hours after the injection, reaches the maximum 9 to 15 hours after the injection, and returns to the normal 18 to 26 hours after the injection.

The reaction varies from 1 to 6 degrees above the average normal temperature. In healthy subjects the quantity of Tuberculin injected is so small that the animal is not affected by it.

In conducting the tests the following course is recommended to those who wish to obtain the most accurate results.

1.—Begin to take the rectal temperature at 6 A. M., and take it every two hours thereafter until midnight, to get the normal temperature of the individual and to note that no disease exists.

2.—Make the injection at midnight.

3.—Begin to take the temperature next morning at 6 A. M., and continue as on preceding day, to note the reactions.

Where large herds are to be examined or time does not permit of more detail:

1.—Begin to take the temperature at 8 A. M. and continue every two hours until 10 P. M. (omitting at 8 P. M. if more convenient). Or, take the temperature three times—morning, noon and evening,—before the injection.

2.—Make the injection at 10 P. M.

3.—Take the temperature next morning at 6 or 8 A. M., and every two hours thereafter until 6 or 8 P. M.

Inject 2 cubic centimeters (about 30 minims) of the tuberculin solution. Yearlings and two-year-olds should receive 1 to 1½ cubic centimeters, according to size. Bulls and very large animals may receive 3 cubic centimeters. Make the injection beneath skin of neck or shoulder.

There is now and then uneasiness, trembling and the more frequent passage of soft dung. There may also be slight acceleration of the pulse and of the breathing.

A rise in temperature on the day following injection of 2 or more degrees Fahrenheit above the maximum observed on the previous day should be regarded as an indication of tuberculosis, particularly if the temperature reaches or exceeds 104° F. For any rise less than this a repetition of the injection after four or five weeks is highly desirable. In very rare cases the temperature may arise in apparent absence of disease or it may fail to rise when the tuberculosis is advanced and easy of physical diagnosis.

For convenience in making the test the animals should not be turned out, but fed and watered in the stable. It is desirable to note the time of feeding and watering.

MALLEIN OR MALLEINE.

This antitoxin is used as a diagnostic agent for GLANDERS and FARCY in the same way that Tuberculin is used to diagnose Tuberculosis.

The dose depends upon the way in which the product is procured, i. e. whether concentrated or diluted. It is printed upon the vials.

Only antitoxins from manufacturers with the best reputations should be used.

DIRECTIONS FOR USING MALLEINE FOR THE DIAGNOSIS OF GLANDERS.

Take the temperature of all animals to be tested three times a day for one day before making the injection.

The injection is most conveniently made at six or seven o'clock in the morning, and the maximum temperature will then be reached by or before 10 P. M. of the same day.

Make the injection beneath the skin of the middle of one side of the neck, where any local swelling can readily be detected.

Carefully sterilize the syringe after injecting each horse by flaming the needle over an alcohol lamp.

Take the temperature every two or three hours for at least 18 hours after the injection. Sterilize the thermometer in a 5 per cent solution of carbolic acid, after taking the temperature of each animal. The temperature will begin to rise, as a rule, within from 4 to 8 hours after the injection, and reach its maximum from 10 to 16 hours after injection. On the day succeeding the injection take the temperature at least three times, if possible. In addition to the febrile reaction, note the size, appearance, and duration of any local swelling at the point of injection.

Note the general condition and symptoms of the animal both before, during, and after the test. After four or five days the injection may be repeated, if the reaction from the first injection is not entirely satisfactory.

Keep the solution in a sealed bottle in a cool place.

The experiments conducted at the Veterinary Experiment Station of the Bureau of Animal Industry and elsewhere, have shown as quoted below:

1.—"That the injection of the Malleine causes a rise in the temperature of 2° to 5° F. in all horses affected with glanders except sometimes in well developed or advanced cases of the disease, already having a temperature of 102° F. or above. In no case has the maximum temperature of a glandered horse, following the injection, fallen below 103° F.

2.—"On the glandered horse an abrupt, hard, painful swelling, 4 to 10 inches in diameter, occurs at the point of injection. This generally begins to appear 2 to 4 hours after the injection, continuing on the next day and increasing in size, from 1 to 3 days, disappearing again in from 3 to 9 days afterwards.

3—"Subsequent injections in glandered horses gave a similar reaction, although frequently less marked.

DIRECTIONS FOR DISGUISING THE COLOR, TASTE AND ODOR OF MIXTURES.

It is frequently desirous to give a pleasant taste and odor to nauseous mixtures, especially when they are to be administered to animals that vomit, particularly the dog whose stomach is very easily irritated by nauseous mixtures.

Color is frequently added for its pleasing effect to the eye.

And again the disguising of our mixtures often becomes necessary from a business standpoint, as a protection against the layman who is ever ready to usurp our remedies.

FOR PLEASANT TASTE.

Tinctura Cardamomi Cardamom }
Tinctura Cardamomi Composita } .....Human dose, ʒ i. to ij.

These give a red color and pleasant aromatic taste, and are carminative in action.

ELIXIR AROMATICUM.

Aromatic or simple elixir gives pleasant aromatic taste and is carminative.

SYRUPUS AURANTII.

Syrup of orange peel gives a pleasant taste.

Syrupus Glycyrrhizæ.—Syrup of Licorice Root.—A nice agent to overcome bitter or nauseous taste.

The combination of Syrupus Glycyrrhizæ and Syrupus Aurantii, usually overcomes the most disgusting taste in drugs.

Syrupus Yerba Santa Aromaticum.—Used to overcome the bitter taste of quinine.

Syrupus Simplex—Simple syrup.—A saturated solution of sugar in water, gives a sweet taste.

Aqua Cinnamomi—Cinnamon water.

Aqua Menthæ Piperitæ—Peppermint water.

Aqua Gaultheriæ (wintergreen). These three impart their characteristic odor and taste to solutions and mixtures; in addition they are carminative and stomachic.

The above named agents are very mild and can be given ad. lib.—usually though in ½ to 1 drachm doses.

FOR PLEASANT ODOR AND FLAVOR.

Oleum Gaultheriæ(—Oil of wintergreen).

Oleum Menthæ Piperitæ—(Peppermint).

Oleum Cinnamomi—(Cinnamon).

Oleum Lavandulæ—(Lavender flowers).

Oleum Bergamottæ—(Bergamot).

In liquid mixtures the aqueous solutions of these agents are preferred; should the oils be used however, about two drops to the ounce is sufficient.

In powders and ointments from 2 to 5 drops may be used.

FOR COLORING LIQUIDS.

Tinctura Santalum Rubrum—Tincture of Red Saunders or Sandal Wood.—Imparts a ruby red color.

Tinctura Curcuma.—Gives a yellow color.

Indigo Blue.—For a blue color.

Caramel—Solution of burnt sugar.—Gives a deep, dark red to a brown color, according to quantity used.

Tinctura Coccus—Tincture of the cochineal insect.—Imparts a rich, ruby red color; darker, richer and more brilliant than a solution of carmine (carmine is made from the cochineal insect).

Solutio Carmine.—A solution of carmine which gives a pink to a bright red color according to the amount used, (one or two drachms to the pint is enough).

FOR COLORING OINTMENTS AND POWDERS.

Carmine—For pink or red.

Powdered Curcuma—For yellow.

Bole Armenian—For pink.

Powdered Glycyrrhizæ—For yellowish or brown.

Charcoal—For black.

Directions for making a staple solution of carmine:

℞	Carmine,	ʒ ij.
	Aq. Ammon. Fort.,	ʒ j.
	Glycerin,	ʒ iij.
	Aq. Dest. Qs. Ad.,	Oj.

Rub the carmine up in the ammonia, then add the water, shake, then add the glycerin to preserve it.

If it should start to decompose (get fœtid and merky) add a little more Aq. Ammon. Fort.

For Making Tincture of Cochineal.—Powder the insects, let them macerate (soak) for eight days, in the proportion of one part to eight parts diluted alcohol.

In prescribing coloring agents for colorless liquid mixtures or solutions, should you not know the quantity necessary to impart the characteristic color of the agent used, it will be sufficient to add as the last item in the prescription the name of the coloring agent followed by the abbreviation qs., for example:

℞	Hydrarg. chlor. corros.,	grs. vijss.
	Ammoni.. chloridi,	grs. vijss.
	Aqua,	Oj.
	Sol. carmine qs.,	

M. Ft. Sol. Sig.—For external use.

Although as a rule it is better that you prescribe an exact quantity. One to four drachms of any of the agents mentioned for coloring liquids is about the proper amount.

Poisonous solutions that are colorless, such as solutions of the bichloride of mercury, etc., should always be colored, to attract the attention of the one using it that it is medicine and not water or some equally harmless substance.

ERRATA.

And, on page 23, 18th line from bottom, should be *end*.

Soda, calomel, on page 27, 5th line from bottom, should be Soda, *cholagogues* are calomel, etc.

Apparatus by controlling, on page 32, 4th line from bottom, should be *apparatus controlling*.

Made, on page 36, lines 12 and 14 from bottom, should be *incompatible*.

Large, on page 37, line 7 from top, should be *extraordinary*.

Put after, on page 37, line 7 from top, should be *put ! after*.

Does neither, on page 45, lines 7 and 6 from bottom, should be *acts between the two*.

Does neither, on page 48, line 1 from top, should be *acts between the two*.

℥ ii, on page 52, line 15 from top, should be ℥ ii.

Sulphatis, on page 57, line 4 from bottom, should be *Subsulphatis*.

Hydrastininæ, on page 71, line 8 from bottom, should be *Hydrastininæ*.

5½ ozs., on page 71, line 5 from bottom, should be *1½ dr*.

Synergist, on page 78, line 4 from top, should be *Synonym*.

Give, on page 86, line 10 from bottom, should be *use*.

Cinnamonia, on page 113, line 6 from bottom, should be *Cinnamomi*,

Dogs, 1-20, on page 121, line 4 from top, should be *1-120*.

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